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GILB. IRONSIDE

Vice-Can. OXON.

Feb. 20. 1689.

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A  
PHYSICO-MEDICAL  
E S S A Y

Concerning the late frequency of  
APOPLEXIES.

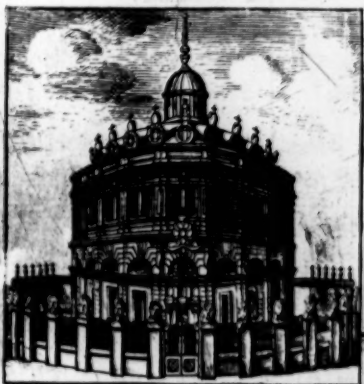
*Together with a general Method  
of their Prevention, and Cure.*

In a Letter to a Phyfitian.

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By *WILLIAM COLE*, M.D.

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O X F O R D,  
Printed at the THEATER. 1689.

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*To my much esteemed Friend  
Samuel Kimberley,  
Dr. in Physick.*

*Dear Sir.*

**T**Hough I must look on your request, to have my thoughts of the cause of the greater frequency of *Apoplexies* these late years, than formerly, as only an instance of your modesty, in giving a deference to the judgment of others, when, I doubt not, your own notions, if you please to draw them forth, can better satisfy both your self, and all men else, than any I can produce; yet that I may not be wanting to the friendship I have so long in reality professed for you,

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I shall for once venture to present them to you, however unaccurate ; which, being addressed to a friend, may expect to be candidly interpreted, although they bring not the satisfaction you expect.

'Tis true; I have heard the *ʒm* questioned ; it being alledged that this distemper might, amongst the vulgar, be ranked under some other classe, in regard 'tis not to be presumed they should know to assigne the right names to diseases ; till the fate of a Great Prince, our late most gracious Sovereigne, commonly reported to have dyed of it, might give a general notion of the name, as well as imprint apprehensions of the danger. And indeed it may be suggested, that such an accident, happening to so great a person, may make stronger impressions on mens minds, than when it falls on those  
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who make a lesser figure, and thence make them take notice of what they would not otherwise have heeded. Besides that the report must, on that account, be the more diffusive; and so being conveyed amongst many of all tempers, must meet with some of very apprehensive ones, whose fears will easily be propagated to others; it being natural to all men to reflect upon what they think carries danger, (especially when 'tis strongly and frequently inculcated) in order to prevent it, if not to have their spirits depressed by it, from whence perhaps such may be more disposed to receive the *Idea's* (to speak in the language of *Helmont*) of such a disease.

But if we duly consider it, we may find, that it hath been both known by Name, and dreaded by

those of all Ages. For besides that all practical Authors (from whom the vulgar must be presumed to have first received it) treat of it *ex professo* by that Name, the very surprize must necessarily excite a notion of it in all, it being so very different in its symptoms and fatality from all other distempers. So that the many accounts continually brought of great persons, as well as those of a lower rank, that have been snatched away by it, are not to be looked upon as only the true notion of it retrived, which was before mistaken, but a real increase of it now; and may too much justify the melancholy apprehensions of the *Gentlemen* you spoke off, who desire an information concerning it.

To endeavour then to give a satisfactory answer to your question, 'twil be requisite I consider, though briefly,

briefly, the particular *Seat, Nature,* and immediate *Causes* of the distemper, as also the *Disposition of the Part*, where 'tis seated, to be affected. And though this disquisition have been so often and learnedly made by many Authors, yet most of them differing from others in some particulars, it may hope your more favourable interpretation, if I do the like from any of them who may perhaps be your favourites, when by their example I shew why I do it: since as the notions of all cannot be reconciled, so no man is obliged to think precisely with any other, be his reputation ever so great.

I propose not to my selfe to deliver all their opinions (which your own reading supplys you with better than I can) much less solemnly to refute them. But I must neces-

farily touch on some particulars in a few of them, in order to make out my own thoughts.

To the *First*, 'Tis agreed by the generality of Physitians that the *Brain* is the seate of the *Apoplexy*; only *Helmont* places it in the *Præcordia* (as most explicitly, *De Lithiasi*, Cap. 9. §. 52, & 70.) whose offence against the *Schooles*, and contempt of *Anatomy* (though otherwise he must be owned to be a man of great parts and learning) might possibly prompt him, in opposition to the Antients and their followers, to take up with some opinion, that presented it self with any colour, that might contradict theirs, rather than agree with them even in the most obvious and convictive ones, though ever so clearly demonstrable too upon dissection. For indeed, besides *Anatomical autopsy*, which  
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is too clear to be contradicted, all the *Symptoms* argue it to be seated in the *Braine*. For even in the most sudden seizure, when the persons affected have not time allowed them to declare their perceptions, 'tis evident that the stroke is impressed on the animal faculty in general, by the immediate cessation of its functions, the vital (so called) continuing, for the most part, entire for some time; which must argue the cause to reside about the original of it, the *Brain*, since from thence only that failure can so generally be effected. But when it begins with less violence, so that there is any interval betwixt its invasion, and the total defection of the animal functions, they generally complain of, either a *vertigo*, or a great oppression and paine in the head; upon which presently follow stupid-

stupidness, somnolency, dazling of the eyes, a relaxation of all parts of the body, and the like: all which are so evidently deducible from the consideration of the nerves affected at their original, that twere time lost farther to prove it.

But since 'tis not satisfactory enough to assert in general, that the *Braine* ( which is an accurately organized part, in which there is a great variety of cels and vessels, and a considerable difformity of parts one from another ) is the seate of this distemper, without determining whether *the whole*, or any *particular region*, or part, of it be especially affected, Authors have employed themselves in this searh.

The most celebrated opinion, and which most have followed till this Age, was that of *Galen*, who assigned the *Ventricles* for the particular  
*Seate,*

*Seate*, and supposed a *viscous matter* got into them to be the cause of it. This opinion, though it might give some account of the interception of the animal spirits, which (according to the antient doctrine are to actuate the body by being distributed along the nerves, on the account of the compression these must so undergo near their original, which distribution failing, all animal motion, in the parts influenced by the nerves which labour under this compression, must cease; yet (with all deference to the memory of *the great Author*, as well as to the abettors of it) I conceive, may rather be presumed to suggest a reason of a *Palsy*, than *Apoplexy*, and can hardly be made out to be the cause of so sodaine a seizure; since such a congestion must be slow, and so the effect generally must come  
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gradually : whereas from a perfect state of health the *Apoplexy* on a sodaine ( as the name imports ) ordinarily seizes. Besides though the passages of the spinal marrow, and nerves thence arising be thus *closed* ( rather than *obstructed* ; an obstruction being generally, I conceive, in the common acception of the word, understood to be from some matter within their tracts, and not properly from it externally compressing them ) whereby the spirits cannot readily descend into them ; yet their motion in the *Brain* may possibly for some time be free enough ; and consequently the Soules exercise may be then entire for a while, if not indeed exalted from the confinement those have to the *Brain* in that case : and 'tis observed many times that, in a *Hydrocephalus*, Intellection, and other animal faculties

ties fail only gradually, though the Ventricles have been found upon dissection to have been much filled; which they must have been long time a doing. Withal, what is once got into the Ventricles has no farther communication with the animal spirits, being disterminated from the *Brain* by the interposition of the membranes. But *Galen* seems not very consistent to himself in this notion, as making the *Brain* it self ( *De loc. affectis lib. 3. cap. 10.* ) to be the seate of it, without there mentioning the Ventricles, whereas before ( *cap. 7.* as well as in other places ) he only seated it in these, exclusively to the substance of the *Brain*.

But that *Hypothesis* is now antiquated, and the *substance of the Brain*, generally owned to be the *seate* of it, Anatomical observations  
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having, as I said, made it apparent it must be seated there. And tho several Authors have diversly explicated it, yet there are two opinions particularly which are now adayes most celebrated, and perhaps deserve to be so, both on their own account, as being each of them very specious, though somewhat different from each other, as also of their Authors, the famous *Wepfer* and *Willis*. These indeed seem to agree in their notion of the particular seate of it, *viz.* both of them assigning the *Medullar substance* of the *Brain* and *Cerebellum* for it. But they differ here in that the *former* considers the whole compage of them both under that name, in contradistinction only to the *Ventricles*; the now received distinction into *Cortical* and *Medullar* ( more properly so called ) having not been  
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then thought on ; and therefore he seems to suppose *any part* of the *substance* may be the *seate* : whereas the *latter* supposes it to be in the *corpus callosum*, or true *Medullar* part according to that distinction ; but withal he asserts that the morbidick matter is transmitted to it through the *Ambitus* or *Cortical* ; the Arteries ( which are the conduits for conveighing it, whatsoever it be, either immediately, or mediately ) passing all through it. But they differ in their explication of the *mode* of production. For *Wepfer* supposes that the *Brain* is either denied a sufficient afflux of blood, of which he assigns several causes ; or if it have that, yet that the distribution of the spirits into the nerves is hindered either by an *obstruction* of them at their originals, or their *compression*. But *Wil-*  
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*lis* doubts whether the former of these, the want of a supply of blood, can have place here, since 'tis known there are every where about the *Brain* ( as well as in other parts of the body ) mutual *Inosculation*s of the arteries, on the account of which 'tis not to be supposed that all the branches of the *Carotides* and *Vertebral* can on a sudden be obstructed, but that if some happen to be so, yet all parts of the *Brain* must receive the blood quickly enough from those which are free, by means of these *Anastomoses*, and so the nerves may be readily enough supplied; or if these arteries chance to be totally obstructed, he thinks the consequent distemper will not be properly an *Apoplexy*, but a *Lipothymy*, or *Hysterical affect*. From which consideration he deduces, that what makes an *Apoplexy* must be  
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be something in the *Brain* it self, that causes either a *solution of continuity* in it, or *insinuates* it self into the *Meditullium Cerebri*, or *original of the nerves*, and there either *obstructs* the passage of the spirits into them, or else on the account of some narcotick, or other disagreeable quality, *dissipates* or *depresses* them. Both these notions may with much greater advantage be had from the learned Authors, than a short abstract; for which too, under this head, I should apologize, this relating to the *Cause*, but that withal it conduces to determine the *Seate*.

But though Dr. *Willis* have so speciously urged against that tenent, of the *non-admission of bloud* to the *Brain*, to produce an *Apoplexy*, yet I suppose that (with all deference to his great judgment) his opinion,  
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that the proper *Medullar* part of it is the *only*, or at least *most frequent*, seate of it, is somewhat too contracted, not to say precarious; and that on the other side, though an *Apoplexy* may perhaps sometimes begin in the *corpus callosum*, yet rather and much more frequently, in the *Cortical* than there, or amongst the nerves at their original. For though 'tis probable the *Meditullium cerebri* is the place where the soule principally acts, and from whence she dispences her influence to the rest of the body, and therefore she cannot be said to be disturbed in her actings, and so a distemper be introduced, till that part be disaffected; yet I conceive that part is properly to be reckoned the *Seate* of a distemper, where the *Cause* that influentially occasions the defection of natures due actings, first fixes it  
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self: otherwise I see no reason but that *Wepfers* denegation of spirits, which *Willis* oppugnes, might be sufficient both to *make*, and *denominate*, an *Apoplexy*. And indeed that the *Cortical* is most apt to receive the morbisick matter, seems obvious from hence, that in it the arteries are most numerous, and it most lax and yielding; so that when from any occasion the blood is apt to *get out of*, or, at least *distend*, its vessels, or indeed but to *exude* out of them, 'tis probable this may be done more easily *here*, than in the *corpus callosum*. 'Tis true, it must be granted that the arteries are disseminated through all parts of it, even to the inmost; otherwise they could neither receive due heat nor nourishment (if at least nourishment come immediately from the blood to any parts but the roots

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of the Nerval tree, numerously dispersed through the cortex ) which vessels though penetrating ever so deep, if they chance either to *open*, be *broken*, or become *relaxed*, whereby they may let go some of the substances they carry ( after the manner by and by to be alledged ) 'tis obvious must soon supply the matter of a considerable inundation ( if I may so call it ) of the blood, or those substances of it which are apt to secede, upon these parts of the *Brain* to which they reach, from the impetuous protrusion from the heart: and the vessels being here tenderest ( as all vessels not only are at their extremities, but especially when they runn deepest, and proportionally farthest, because then they are smallest ) 'tis no wonder that a congestion should soon be made where this is. But yet if we  
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consider their comparatively small number to those in the *Cortical*, and how they must be better fenced and supported by their being distributed through a more compact substance as the *corpus callosum* is, there seems less danger of either a *congestion*, or *extravasation*, in this region; the strength of the tone of any part mainly conducing to the ready transmission of the perluent liquor. And that this happens most usually in the *cortical region*, three, of the four instances alledged by *Wepfer*, seem to evince; in which I conceive it is easy to gather that they were the *extreme* parts of the *Brain* that were *most* disaffected, and therefore there seems reason to suppose must be *primarily* so. But from hence.

*Secondly*, The *Nature* of the distemper may be deduced. And it seems to me probable, that it con-

sists indeed in the *defect* of that matter, which should be supplied to the nerves for the exercise of the animal functions, but occasioned from the *vitiated organization* of the parts and vessels of the *Brain*, from whence a due secretion (which I have heretofore [*Tr. de secretione animali*] endeavoured to make probable to be here performed by a *simple colature* in the *Cortical glandules*) of the nervous liquor out of the blood cannot be made, but that, either from the forementioned distention of the sanguiferous vessels, the secretory ducts cannot readily admit the matter to be separated; the confusion of the masse, emergent upon such a congestion, prohibiting a regular secession; or else the grosser substance of the blood, not moved as 'twas wont, being brought to the beginnings of  
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the nerves, must needs obstruct them, and so cause an immediate cessation of motion in all parts below, as well as, by disturbing the regular motion of the spirits in the *Brain*, hinder the exertion, not only of the Intellectual, but also sensitive faculties.

For though *Intellection* ( and possibly *Sence* ) belong only to the *Soul* as such, which is a substance distinct in it self from the *Body*; yet the exercises of it, so long as the soul continues united to the body, cannot be had but by its mediation: our bodies being very fitly resembled to *Hydraulick Engines*, whose structure disposes them to exhibit a great number of various *phænomena*, when filled with a due liquor, and set on work by a mover distinct from them ( whether within or without 'tis not material ) which,

as they, whilst in order, very regularly perform all the motions their fabrick directs to, so if they happen to be either accidentally broken or disordered in any part, or else the liquor they carry comes to be so gross as to obstruct them, or corrosive, or otherwise vitiated, as to make its way through them, must either undergo a total loss of their motion, or at least a very great disorder in the several performances that the organical design requires. Agreeably to which, the *Bloud* appears to be the *principal liquor* for the motion of this curious engine of our body, as being universally and unceasingly carried through all parts of it. (Not to make a comparison betwixt *this* and the *Nervous juice*; which though it may be designed for more noble, and perhaps much more extensive  
 proxi-



proximate uses, than the gross masse of the blood, yet must be owned, on the account of its small quantity, and slow motion, to be not fit for this design, otherwise than to spiritualize, and give an instinct to that and the Heart that impels it, adde that 'tis made out of the blood.) Now if through the fault of its pipes, the *arteries* and *veines*, it make its way out of them, it must of necessity extremely disaffect the parts in which this happens, especially when they are designed for the nobler sort of uses. Indeed *Life*, as well from arguments of *Reason*, as the *Divine Oracles* (which tho' they teach many things above, yet none against, *Reason*; and I conceive ought to be construed literally when the analogy of reason and nature countenances it, though many things in them are owned to be spoken

ken according to mens common apprehensions; holy scripture being designed not to teach, *Philosophy* seems to consist *originally*, and therefore *principally*, in the *motion of the Bloud*, its first *indicia* being from the *punctum saliens*; for which therefore so exquisite pipes are made to distribute it to all parts of the body, and return it back again to its first source for reiterated motions, and those so adapted to the secretory parts, for the separating of substances from it for several uses; that as all vital actions must needs be placidly performed whilst they are thus duly disposed, so if any of them happen to be broken or opened (at least in any considerable measure) whereby this vital stream gets forth of its boundaries, that due and regular *motion* thence ceasing, *Life* must too.

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But this must most effectually come to pass, if this disturbance of the motion of the blood chance to be in the *Brain*, where the *Soul* sits (by the consent of almost all) inthroned, and from whence she gives laws to all the Body: so that if this her Royal seate happen to be overwhelmed with such a deluge, and her intercourse with the rest of the body, which her Empire over it requires, intercepted, 'tis no wonder she leaves her province and mansion, thus become so unfit for her residence. But I must beg your pardon for these allegorical excursions, which yet the luxuriancy of the subject readily affords.

This fault in the *due Organization* of the *Brain* consists, either in an *Obstruction of the passages*, or a *Solution of the continuity*; either of which may easily occasion any of the

the symptoms. For the *former* ; 'tis impossible but that (since there is a necessity of a due proportion between the cavity of the vessels and the liquors, as well here, as in innumerable instances every where to be met with, to the performing of regular motions) if any *obstruction* happen, the *Liquors* must either *move more sparingly* than is requisite, or be *congested* there, or else the course of them must be *diverted* into other channels, and so nature's designation (to be discerned by the known effects) must be altered: from any of which occasions, as there must happen a defect of spirits to actuate the *Brain* and nerves, and that proportionally to the greatness of the obstruction; so if this happen suddenly, and be total, 'tis evident that there must follow both a total and sodaine abolition of the  
 animal

animal functions. In the *latter*, the Bloud, flowing out of its vessels, must, in so tender a part as the *Brain*, quickly *overflow* a great part of it, being urged on by the impulse from the heart; and then 'tis obvious that all the regular motions and secretions there, necessary to animality, must immediately be interrupted; the passages designed for carrying select substances being thus both *enlarged* and *filled* with heterogeneous and gross ones, which make up the much greatest part of the Bloud. So that hence,

*Thirdly*, What is called the *Containing cause* is easy to be collected, viz. some matter either *discharged out of* the sanguiferous vessels upon the substance of the *Brain*; or else, *filling* and *distending* them, and thence *compressing* the sides of the passages in it. This may either be,

1<sup>st</sup>,

1<sup>st</sup>, the *Bloud* in its whole substance, whether good, or impure; since in either constitution it may, if either congested in too great quantity, or too impetuously moved, get out of its vessels, or else so distend them, as to produce the mentioned effect. Or, 2<sup>dly</sup>, some *Viscouse matter*, proceeding from the *Serum* become less spirituous, whose particles therefore are disposed to lay hold one of another, and so to grow clammy, and consequently unapt to pass along the usual tracts, but apt to stick in the laxer interstices between the arteries and veins in the habit of the *Brain*; to which more, being continually brought by the continual motion of the *Bloud*, may by a likeness of substance, still associate it self, till it come to a congestion great enough to cause such an obstruction, as may at last hinder

der the circulation, or at least the separation of such substances from the Blood, as must actuate the *Brain* and nerves. From such a cause too *Inflammations*, which are some of the acuteſt, as well as the moſt frequent ſort of diſtempers that aſſaile us, often ariſe; and 'tis generally to be obſerved that in *pleuriſies, anginas, &c.* the Blood is exceeding viſcous; which quality in it diſpoſing it to obſtruct, muſt therefore, when that happens, cauſe a congeſtion all about, the Blood inceſſantly arietating againſt that place, and thence ſoon an inflammation. Or, 3dly, a greater collection than uſual of the *fluid Serum* in the Blood, though not diſpoſed to viſcoſity, but inſtead thereof grown too ſharp, which thence may be very apt to make its way through the paſſages in the habit of the *Brain*, whoſe natural

tural Make might keep out a less thin *Serum*, such as belongs to the Blood duly constituted but cannot this, in regard its particles are perhaps become less than the *diameter* of the pores of the vessels 'tis naturally carryed into; or else these pores may come to be so dilated by means of the continual lancements, that the resistance of their sides may soon come to be overpowered. Or, 4<sup>thly</sup>, *polypous concretions*, (those *infelicia ægri cordis germina*, as *Wepfer* calls them) which have their construction from the fibrous parts of the Blood, whose Make being oblong and ramous, numbers of them may happen to associate in the heart too strictly, and being, when once thus associated, unapt to be dissolved, must make *carneous concretions* there; where being radicated, they may grow to a considerable



derable bulk and length, and diffuse themselves all along the arteries to a great length: the manner of whose production the accurate *Malpighius* (*de polypo cordis*) has very curiously described. These *Wepfer* supposes may make an *Apoplexy* on a double account, *viz.* either *entire*, or *broken*. The *former way*, by being propagated from the heart up to the entrance of the *Carotides* and *vertebral arteries* into the skull, which vessels, being extensive before, let the Blood pass by these *polypi* up to the *Brain* before they reach those perforations of the skull; but when once they do that, the arteries being confined by the bones, through which they pass, must be totally stopped by them; and so the Blood being prohibited from coming to the *Brain*, an *Apoplexy* must according to him, follow.

Which

Which supposition indeed, if it could be demonstrated, would prove the greatest instance of his assertion, that *Apoplexy* may proceed from a *denegation of Bloud* to the *Brain*. But, besides that 'tis hard to conceive all these four arteries should be stopped at once by this cause (which if they be not, the Bloud coming by any one will be diffused by means of the *Anastomoses* all over the *Brain*, for the continuance at least of the animal actions, though perhaps in somewhat a lower degree) it seems moreover probable, that this should rather be ranked under the class of *Cardiacal Syncope's*, whose symptoms are very like those of an *Apoplexy*: and so many and large *polypi*, as must effect this, would in likelihood kill, by hindring the Circulation through the heart, before they could grow  
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to the length and bigness requisite to cause this obstruction. But the *other way* by which he supposes an obstruction from them may come, is the *breaking* of them off being grown fracid; which happening, the course of the Bloud must carry them on into those narrower passages; whereby it might be presumed there would follow such a sodaine obstruction as must produce an irremediable *Apoplexy*, did not his instance of *James Knoll* evince the contrary; who, though the arteries in his *Brain* were full of them, yet had never any touch of an *Apoplexy*: unless we should suppose those were not true *polypi*, which, as I said, are generally of a carneous nature, and radicated in the heart, but only associations of yiscous substances in the degenerated Bloud, formed in those places where he found them.

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But indeed it seems probable, that if any of these broken *polypi* get into the narrow passages of the arteries in the *Brain*, they may cause such a stop of the Blood there, that it not finding its usual way open, may, by the impetuosity of its motion, make it self a new one into the substance of the *Brain*.

So that from any of these causes the Blood in its circulation passing (as I have said) *irregularly* through the *Brain*, may, if this part happen to be more than usually susceptible of an impression from it, either *deflect* into the *lateral* yielding *recesses* in its habit, or by reason of a partial obstruction of the vessels, *distend* them; since being impelled in the usual quantity, but deficiently transmitted, there must quickly follow such a congestion, that either a *stagnation* of it in the vessels

fels must happen; or an *exudation* of some parts of it through the widened passages; or else, if the impulse prove to be more violent, a *laceration* of them; from whence comes an *Extravasation*, which will be continually increased from the continual impulse upon parts thus become unfit to resist the motion.

But of these causes of *Apoplexies*, especially those which prove most fatal, the *Effusion* of Blood, mentioned, seems to be the most usual ( though as I see not but the distemper may, as I said, proceed from only a *Congestion*, so possibly this may be that from which most recover that doe at all, however by continuance it may prove as dangerous, as being the beginning of that by effusion, and a stop of the Blood even in the vessels for any considerable

rable time necessarily kills ) both  
 from what appears upon dissection;  
 not only *Wepfers*, before mentioned,  
 but others, observations evincing  
 it, and I my self happened to ob-  
 serve the same in the dissection of  
 a very worthy Lady, the Lady *Pa-*  
*kington*, the relation whereof was  
 published in the Philolophical Tran-  
 sactions, *Num.* 173. *A. D.* 1675. as  
 also in regard it seems difficult to  
 make out how, from a *slow conge-*  
*stion*, if *viscous matter* be the cause,  
 or from an *exudation* of *Serum*, the  
 diffusion whereof, though somewhat  
 more speedy than in the supposi-  
 tion of viscosify, is yet compara-  
 tively slow to the sodainness of the  
 invasion, much more from *so very*  
*slow a congestion* as must produce  
 a fleshy substance as the *polypus* is  
 ( unless on the occasion of its dislodg-  
 ing, even now mentioned ) all the  
 Animal

Animal functions from a perfect exercise of them, as is most usually observable, should so instantaneously be destroyed. Whereas the *effusion of the Blood* out of its vessels may rationally yield an account of this defection with as great swiftness as can be imagined; the Blood as I said before, once got out of its channels being propelled, by means of the impulse from the heart, so as to diffuse it self immediately over the whole substance of the *Brain*, so farr as the investing membrane will permit. And though only *one Lobe* of it chance to be disaffected, yet the commerce being broken off betwixt the spirits in this and the rest ( it seeming probable, though, from the disproportion of our organs to discern those extremely small passages, not autoptically demonstrable, that there is a constant one by

some small *Meatus* through the whole *Brain*) the action of the whole must cease; since 'tis observable that, for preforming regularly the actions which are the province of any organ, *all the parts* of that organ must be duly constituted; and therefore much more ought this to be observed in the *Brain*, whose action is so much more considerable and nice than any of the rest, as influencing the whole Body, as well as its texture is more curious, and substance more tender.

The *Fourth* thing proposed to be considered was, the *Disposition of the part*, where the distemper is seated, to be affected; which having endeavoured to make out to be the *Brain*, we are to reflect that much of the invasion of the distemper (as was before insinuated) is owing to the *vitiated organization* of it, and



and *not all* to the *perluent liquors*. For if it be firme in its tone, and otherwise rightly constituted, there is reason to suppose it may, *cæteris paribus*, much resist morbidick impressions; whereas if it have been before weakned, 'tis obvious 'twill easily yield to them. We see in *Feavers* that the Bloud runnes rapidly enough through it; and in an *Anasarca*, and cachectical habits, the *Serum* makes up much the greatest part of the Bloud, which might therefore be presumed apt to overflow that tender part; so also 'tis observable, that the Bloud many times appears extremely *viscous*, as in *Pleurisies*, *Rheumatismes*, &c. Yet in none of these cases ordinarily are the persons inclined to *Apoplexies*: so that though the irregularities of the liquors may sometimes occasion them without this  
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*predisposition* of the *Brain*, yet when it appears they invade *more frequently* than otherwise they use to do, there seems considerable reason, to suppose, that it *deflects* some way or other in its *Organization* from what is natural to it. This defect, I deny not may perhaps *sometimes* consist in too great a *Closeness of its texture*, whereby a partial obstruction of its vessels may be made by degrees, from the adhesion of some viscouse matter deposited by little and little by the circulating Blood about the capillary arteries, and so the Blood behind comes indeed only to be retarded here whilst no disturbance happens to it, but takes its course to some other region of the Body; but if it once come to be more than ordinarily exagitated, it may become so determined in its motion, as at  
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last to flow impetuously hither too, but not being able to get through its usual channels must produce the effects, before suggested, of an irruption into the substance of the *Brain*: but yet *ordinarily*, I conceive, it depends upon *too great Laxity of it*; whereby, when any forcible impulse happens, it may too readily yield to it, and so be suddenly overwhelmed. This laxity may be considered to consist, not only in a greater *inteneration of its substance* than usual, and thence its easiness to yield to the force of the impelled Blood, to which in its due constitution it bears a proportion; but likewise in the greater *openness of its pores* than is natural, though the fibres that constitute it have their due degree of firmness, whereby it becomes capable of receiving other, and more bulky particles than usual,

usual, as is consequential upon that texture so depraved: which may possibly (as in too ferous and acrimonious a dyscrasy of the Blood) proceed from the abrasion of some of the looser particles that constitute the habit of the part, by the perluent juyce supplied by such Blood, and I suppose might be the case of the *Lady* before mentioned, who being endued with an extraordinary *acumen*, a great evidence of an exquisite constitution of the *Brain*, yet abounded with exceedingly sharp substances in her Blood or other liquors, as many, of her symptoms declared. Which pores likewise may acquire other *figures* than are proper for them; these concurring particularly to determine almost any of the *Secretions*, whether simple or mixed, that happen in our Bodies. So that when the *Brain*  
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happens to have its *Organization* thus vitiated, and the *other causes* concurr, an *Apoplexy* may in probability easily enough be produced.

So that, to recapitulate, I conceive the *part effected* may either be the *whole Brain*, or any *considerable part* of it, and either the *Cortical*, or *Medullar*, but especially (or at least first) the *Cortical*, from whence the disaffected matter is transmitted to the parts of it which lye deeper, where the animal spirits principally exert themselves; the *Nature of the distemper* to consist, in the *sodaine abolition* of the due *excrasie*, and *distribution* of them thence; the *immediate cause*, most usually (when unavoidably fatal) an *effusion of Bloud* out of its vessels upon the *substance of the Brain*, though I conceive a bare *distention, of the arteries* there may occasion  
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it, as also may perhaps a *congestion* of *viscous* or *serous matter* when it comes to a considerable degree, and becomes freshly *excited*; or else *Polypous concretions*, or (if we can suppose it) *any other* obstructing matter deposited in it, may at last produce it; and the *predisposition* of the *Brain* to it, to consist, *usually*, in the more than *ordinary laxity*, or *openness* of it.

These things premised I consider (to advance a little farther toward the solution of the Probleme) that whatsoever, either *1<sup>st</sup>*. causes a congestion of Blood, or *2<sup>dly</sup>* otherwise so indisposes it, that it cannot readily and duly circulate through its usual vessels in the *Brain*, or else *3<sup>dly</sup>* disaffects the *Brain*, whether by weakening its tone, or altering the figures of its passages, or straitning them too much, may occasion

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*Apoplexies* : and the greater urgency or violence, of such antecedent causes may introduce a greater frequency of them than ordinary.

As to the *first*; Besides common observation, 'tis obvious to any mans reason, that those who indulge themselves in full meales, but especially in copious drinking, and use not due exercise, may fall into them, especially if their natural constitution incline them to breed Bloud plentifully; since so it must be heaped up in too great a proportion for the vessels, and thence may easily be supposed to make its way out of them, upon, even light occasions into the most yielding parts. Besides, persons given to these excesses doe frequently, either voluntarily, or by the necessity of the irrigation made on the *Brain*, allow themselves likewise great liberty

ty of sleeping, and so relax the *Brain*; whereupon the Bloud flowing more plentifully in the usual posture of it, *viz.* lying along, may be presumed without great difficulty to get out of its vessels, distended on this occasion, into it. And it seems rather to be wondred at that no more fall into them, than that some doe from this cause; since there are so obvious reasons of their production from the number of those who thus indulge themselves. But this seems no adequate reason of their greater frequency now than formerly, since these excesses have been of a much longer date, than to give occasion hence to justify the temperance of former ages comparatively to ours. Therefore,

*Secondly*; as to the causes of those dyscrasies of the Bloud, from whence the immediate continent cause of  
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*Apoplexies* flowes, we must seek them from without us, since our Bloud has its supplyes so: and its motions, whether circular or intestine, are excited or retarded by abundance of outward, and the most of them inevitable (our shallow knowledg and foresight in choosing what is proper for us, and avoiding what is prejudicial, and the unmanagable bent of our inclinations to what gratifies us, especially considered) occasions. From which external causes likewise.

*Thirdly*, the disposition of the *Brain* to fall into these distempers must proceed; these being as well disposed to act on the solid, as fluid, substances of our Bodies, as they find them fit to receive their impressions.

The external occasions therefore of our disorders are generally deduced

duced from some or other of the fix Non-naturals, so called, *viz.* Air, Meates and Drinks, Motion and Rest, Sleep and Waking, substances excreted or retained; and the passions of the mind: any of which, if inordinate, may produce such diseases as the Body, upon some peculiar predisposition, is subject to.

'Tis besides my subject to dilate on them particularly, especially as they contribute to produce the groſs of diseases; neither doe I think the five latter so very applicable to my present theme, as to detain me. But the first seeming the most usual and efficacious, as to the production of all, or the greatest part of other distempers, since 'tis so generally influential and unavoidable, so of this, I am obliged to take some notice of it. For we may in a great measure

ture correct irregularities in the rest ; but not so in this , without which we cannot live many moments ; neither is it in our power to correct its disorders, if any thing considerable, since it diffuses it self every where ; and must therefore, if vitiated, be the cause of general distempers , and more especially seems to have a very prevailing energy to introduce that under consideration.

Its disorders are generally reduced to two heads, *viz.* either excesses in ( one at least of ) the First qualities , Heat , Cold , Moisture , or Dryness ; or else Malignity in it , unaccountable for from them ( whatever it satisfactorily be from any other vulgar notions ) which may be of very different kinds, and so produce distempers , different as to their symptoms, yet of that ge-

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neral denomination. These have been so copiously and learnedly treated of by many great Authors, that 'twere very impertinent in it self, as well as unfit for the brevity of a letter, to expatiate on them: but particularly the Doctrine of Malignity seems too abstruse to be discoursed of in few words; only ( if it be not a solecism to pretend to judge of things of which we can assigne so little reason ) it seems best adjusted to give an account of diseases that generally invade, and where indeed surprizing symptoms, whose reasons cannot be assigned from known hypotheses, happen, as in some Epidemical feavers, the Plague &c. For it seems agreeable to reason, that it must be somewhat more than what is deducible from the first qualities, as well as very active, that must so affect multitudes of people

people of different constitutions, and of whom many have no evident predisposition to sickness, with so extraordinary indispositions, and that at times when the Air is free from excesses in any of the first qualities, (or indeed any of the rest of the sensible ones:) and 'tis acknowledged by all, how differently soever they explicate the matter, that these epidemical miasmes are so.

But to give an account of the production of the present distemper, we have no need to have recourse to this abstruse cause. For, first, this can hardly be reckoned among Epidemical distempers, however more frequent than formerly; since at all but few, comparatively to those who are with other distempers, are assaulted with this, and those not in one region, but here and there in farr distant places, at all times of the

Year, and at all seasons, whether of excessive Heat, Cold, Moisture, or Dryness ; ( though , as I shall by and by observe, it took its rise from one of them. ) Secondly, 'twas never observed, nor thought, contagious, as most Epidemical diseases that depend upon Malignity, are ; those subtil steams that occasion them being, as very diffusive, so also determinately fermentative to the production of like substances in the Bodies they enter into ; which when emitted, and then received by others which have a predisposition ( as most have ; a small one being sufficient in so heterogeneous Bodies as ours are, and where the substances that compose them are so lax, and in such an agitation ) to be by them acted on, must affect them in the same manner. Thirdly, there seems nothing in the symptoms but what is constantly

constantly observable in almost all assaulted with it, and agreeable to the general history of it; whereas those called epidemical have generally something anomalous in the symptoms, when ever they so invade, from what has been observed in those of the same denomination at other times. And fourthly it seems accountable enough for, from the consideration of those more obvious qualities of the Air. So that I conceive 'tis rather to be reckoned among the Sporadical diseases, so called by Physicians; and to proceed from some, or one of these (modifications of the Air, which we call) first qualities. But from which of them, 'tis requisite we enquire.

To consider first the Passive qualities of the Air, Dryness and Moisture; it may perhaps seem proba-

ble that they may, in order to produce this, as well as some other distempers, indispose the *Brain*; the former by hardning the tone of the sanguiferous vessels in general, and consequently contracting their tubes, and so causing an acceleration of the motion of the Bloud through them (which must, if propelled with the same force at its original, runne more swiftly through vessels when thus straitned, than whilst having their usual dilatation:) whereby it may be presumed, that when cast forth of the arteries into the interstices between them and the veins at their extremities, it may make its way into the more yielding substances it is any where to pass through: and the *Brain* being confessedly more so, than any other part of the Body, is therefore most likely to be affected on such occasion;



tion: the latter ( which is countenanced by the great Hippocrates, Sect. 3. Aph. 16. ) by intenerating the *Brain* so much beyond its usual constitution, that it may thence become more than naturally susceptible of the always briskly circulating Blood. Next; as to the most efficacious of the Active ones, Heat; it may perhaps be urged that the Blood, though otherwise well enough constituted, being much heated and rarified by that excess of the Ambient, might be inclined to make its way out of the vessels, in the *Brain* especially, on the account of its forementioned tendernefs.

But, besides that experience warrants none of these suppositions, perhaps it can hardly be made out, *1<sup>st</sup>*, That so great a dryness, as must effect this, can be introduced into our Bodies, which are continually irri-

irrigated, not only by the circulating Blood, but other secondary liquors; *2dly*, That a great excess of moisture in the Air should produce *Apoplexies*, unless those more rare ones (as I suppose they are) from the *Serum*, and that generally after other distempers which have weakened the crasis of the Blood, as well as the tone of the *Brain*; since such a dyscrasy impressed on the Blood seems to make it more torpid by clogging the spirits in it, and so less apt to inundations, and besides relaxes the vessels, as well as the substance, of the *Brain*, and so favors its ready passage along them; and, *3dly*, That the excess of outward heat should cause this eruption; since by it the solid parts may be as well presumed to be invigorated to resist, as the Blood excited to attempt it; besides that the transpiration,

tion, that is occasioned by this heat, may sufficiently compensate for the accelerated motion of the Blood, its quantity ( which may in that case be principally dangerous ) being thence diminished.

It remains then to attribute this frequency of *Apoplexies* to the Coldness of the Air, as the most adequate occasion; which when it happens to be intensely so, may, I conceive, be made out to give a probable reason of it.

That Cold is a great enemy to the *Brain*, is both the general sense; and confirmed by the authority of Hippocrates, Sect. 5. Aph. 18. and all *Physitians* since: and therefore we may possibly infer that the great *Architect* fenced this part with so strong a wall, scarce more to protect it from other injuries than this, to which 'twould otherwise be exposed

fed. But how Cold affects it so injuriously may require a little explication.

In order to it, give me leave, Sr, to consider ( without pretending to discuss it so minutely, as men of more *Philosophical* heads, and better accomplished in such speculations, might ) the nature of Cold, as being requisite to be known in some measure to the understanding its relative effects. Which attempt indeed might appear very presumptuous, after that the exquisite Mr. *Boyle* has not thought fit to determine in the matter, but that you may perhaps find that the short deductions I make, however unartificially, are either taken from, or, I conceive, reducible to what he has delivered; and so farr from being positively asserted, that they are only submitted to the censure of your,  
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and others, better judgments. To which purpose three or four general considerations seem not unfit, so far as belongs to our present disquisition, to be taken notice of, to give an account of its manner of affecting us.

In the first place then it may be considered, that though neither Cold nor Heat nor any of the rest of the sensible qualities have any real Being, but only in relation to our perception; inasmuch that were there no sensitive Beings there could be no such things; yet they must be founded on something that does really exist, as all accidents besides are. So that though they cannot be reckoned amongst the general affections of matter, as motion (though they depend upon it) or its contrary, *Rest, Bulk, Figure, &c.* are, which would still be where matter is, tho' there

there were no fenſitive Beings, yet are conſequent upon it, but determined by theſe and aſſociated to ſomewhat that has perception.

*Secondly*, That 'tis evident our ſenſories are affected by Cold, that is, have ſome impreſſion made on them. Now nothing can affect but by approaching to that which it does ſo affect, and to approach requiring motion it muſt follow that motion muſt go to conſtitute the nature of Cold. Which though it may ſeem not ſo evident, ſince Cold is reckoned contrary to Heat; and this conſiſting obviously in motion it may be urged, that ſhould in Reſt: Yet it may be returned, that tho' it be neceſſarily to be inferred, there is motion where there is Heat, yet not always that there is Heat where motion: ſo that 'tis not motion ſimply, but conſidered with ſome adjunct,

junct, *viz.* motion in such or such  
 a degree, and with relation to sen-  
 sitive Beings that constitutes Heat;  
 and consequently that 'tis not to be  
 inferred that Cold consists in abso-  
 lute Rest, because contrary to Heat,  
 but in a different degree of motion  
 ( though other mechanical affections  
 must concur to determine it ) which  
 recedes on one hand from a middle  
 degree of it in our sensory, as that  
 which makes Heat does on the o-  
 ther. Which too may be evinced  
 from hence, that each of them ha-  
 ving a great latitude of degrees must  
 be founded in what admits of de-  
 grees, which motion does, but Rest  
 not.

*Thirdly*, that motion here being  
 not to be considered abstractedly,  
 but together with the subjects of it,  
 and as occasioned by, and produ-  
 ced in some Bodies; we may take  
 notice,

notice, that as 'tis evident the Bodies without us, which excite our sensation, are moved, so our organs, which are designed to receive the impressions of these extraneous objects, and transmit them to the Soul, can hardly be presumed to do it (any more indeed than prove a fit *mansion* for *her*) without having their particles (whether consistent or fluid; for both are necessary to their construction) in motion: and not only so, but endued with a determinate degree of it. This degree ought not to be violent: for so the constituting particles neither could be brought into such a frame as we find they are, nor persist in it; but they (especially the most subtil, which are the Souls immediate instruments in the organ) would soon undergo new textures, or be dissipated. As on the other hand it must not be very  
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languid, since in that case they being in great numbers, and some touching still in their motion upon others which have a different determination, would soon be intangled in one another, or otherwise stopped. But it must be such a middle one, as may keep up a due crasis in both the fluid and consistent substances that make up the organ, for the performing the functions appointed.

*Fourthly*, that these motions (considered as I said in their subject) thus regulated, being congenial to us, seem not properly objects of our perception (at least are not taken notice of) since 'tis by means of them that the Soul receives those impressions that cause a perception of others, but rather instruments of transmission of those others from without, which recede from these degrees,

degrees, or are otherwise circumstantiated: tho' indeed even these, when, becoming either too quick or too slow, they defect from their due proportion, may, by affecting the Soul differently from what they use to do, so excite her, as that she may take notice of them too, as well as those of exterior objects which thus sollicit them.

*Fifthly*, that therefore these mean motions, being what belong to the organs duly constituted, are the standard from whence wee are to take our measures of all others, so that when any objects from without come against, and so affect, our sensories with a greater degree of motion, than what naturally belongs to them, we forme one kind of notion of them; when with a lesser degree, a very different one, and give them likewise denominations according

according to that degree of motion with which they act upon our sensory.

From the consideration of these particulars, we may, I conceive, deduce, that the nature of Cold consists in a check ( though not a total stop ) of that degree of motion, which belongs naturally to the parts of, and fluid substances in, those of our sensories which concern the sense of Touching, duly constituted; as, on the contrary, Heat (without some reflection on which, Cold can hardly be understood ) in an acceleration of such their motions. Which differences being, by means of these organs transmitted to the Soul, and so affecting her, she, forming a comparison between them, denominates one Heat, and the other Cold.

But though motion must have the first consideration in producing

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this effect upon us, yet 'tis farther to be noted, that the Bulk, and Figures, both of the Bodies that cause this check, and those upon which 'tis impressed, must concur to it: it being evident, that not only some are themselves more fit and easy to be moved than others, according as they are bigger or less, of this or that figure, but also to accelerate, or retard, the motions of others that impinge against them.

As to acceleration, wherein Heat consists, minute Bodies, of almost any figures that are irregular, if they are not apt to cohere, may occasion that though some more than others; especially those that are most angular: since with their angles striking against those among which they move, they must be presumed to exert a proportionally greater force, than blunt or glabrous ones can,  
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which on that score are easy to be distorted. But as to retardation which makes the nature of Cold (that we may restrain our discourse to that) it may be occasioned on several accounts. For, first, either the affecting Bodies may, by a correspondency of their sides, so apply themselves to those to which they come, that, transferring their surplusage of motion to them, they may adhere to them, and with them constitute bigger masses, and acquire other figures than before they had: Or, *Secondly*, by altering the due contexture of the vessels (which is necessary to regular motions) they may thence occasion a stop of the substances, which used to be carried in them; and so, though they are otherwise disposed to accelerate motion on the account of their figures, as I said before, yet thus ac-

cidentally they come to retard it: Or, *Thirdly*, if they happen to be of such a figure and texture as to be flexible, and thereby to wrap themselves about those they occur to, they may, by thus inviscating them, hinder their motion: Or, *Fourthly*, ( and which may possibly, in the present case, be the most effectual means of occasioning this check ) they may so interpose themselves between the moved particles in the organ, as to intercept their former motions; whereby also they fill the spaces necessary for continuing those motions. This seems most agreeably to be done by Conical ones, which by their angle are fitted to enter, but being blunt and bigger at the other extremity, must, when they come into porosities, which are a little straiter than that necessarily fix there; and both  
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the more abate the motion of the forementioned agitated matter, and also be more firmly impacted in the parts unto which they thus arrive, by their contraction, upon the score of the lincination occasioned by the sharp angle of these particles first entring: the solid parts, that are sensile, being all the Body over contractile, as being, I suppose, nothing else, but either propagations of *nerves* or the *roots* of them. And when it happens that many such conical substances come to act at once upon the organs, the effect must be the more considerable.

But perhaps, Sr, you may think these speculations too nice and general; and indeed impertinent to the present consideration, since they are not our senses that are in *Apo-plexies* primarily affected; those persons that are violently feyzed

loosing, immediately upon the stroke, the use of them; but only influentially from the *Brain*, which it self is thought to be void of sense actually ( which supposition yet may perhaps be lyable to some exceptions ) though the source of it to all the Body beside: And therefore when they invade more gradually, and those that are affected are conscous of great pain in the head, it may be supposed that the morbifick matter affects the membranes of the *Brain*, as well as the substance, and so causes that symptom. So that if the predisposition to the disease be from Cold affecting a part of our Body not sensible, you may ask to what purpose all this notion of our perception is introduced? However give me leave to say, that since Cold would not properly be Cold, as I have urged, without



without perception; which though it produce all the effects, it does on Bodies not endued with sense, on a purely mechanical account, *viz.* from schematisms of matter in motion, determined by the fitnels of some to act on others, according as they appel to one another; yet as it relates to us, who are endued with sense, and to whom it belongs to define things cannot be well understood without reflection on that; it seems not altogether alien to our purpose to state it in that latitude, since without such a reflection we cannot have a notion of it; and therefore not explicate its positive nature, and what produces it. And indeed whether these speculations are altogether superfluous, may be judged from taking, first, some short view of the nature of the Air, so farr as concerns its aptitude to act  
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on Bodies conversant in it, particularly ours, it being the Medium to convey the influence of exteriour (when not immediately contiguous) objects, or at least necessarily concurring to make considerable impressions on us who, 'tis knowne, cannot live many minutes without it, especially in relation to it when deflecting toward Cold: and secondly, its manner of affecting injuriously our Bodies, particularly the *Brain*, upon the account of the forementioned mechanical affections.

And first, as to the Nature of the Aire; Though, generally speaking, we call so all that vast congeries of corpuscles wherein we breath, which is made up of all sorts of particles from the earth and water, and steames raised from complex bodies in or upon them, yet more properly (according to the Philosophy of  
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the Age, which acknowledges the Excellent Mr. *Boyle* its cheif refiner) 'tis fupposed to confift in the greateft meafure of fpringing particles, *viz.* oblong, and confiderably rigid ones, though very tough, and thence apt enough to be bent by a great preffure, but yet unapt to loofe force of reftitution toward a direct line ( which feems moft natural ) when that preffure is taken off; and which they, whilft thus bent, are continually (from the action of the *materia subtilis* according to *Descartes* ) endeavouring at: From which tendency to reftitution there muft be variety of motions impreffed on all bodies converfant in it, according as they are difpofed to receive its action. But yet among thefe 'tis fupposed there are a confiderable number of others, called Nitrous, whose make may poffibly be  
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that a little before described, *viz.* Chnical or Pyramidall (for I suppose either may solve the Phænomena, which require only acuminated particles whose other extreme should be bulky) and from the mechanick effects may very much justify that most ingenious notion of *Descartes*, who supposes Niter to have Conicall figures. For on the account of these the particles of it may, like wedges, easily intrude themselves into the *Interstices* of any bodies they happen to be carryed against, and, if these be yielding enough, make themselves more and more way amongst them, and therefore may intercept the motion of some as well as very differinglly determine that of others of the fluid substances contained in them; since none, of what texture soever, can be presumed to elude the action of such kind of bodies.

dies. Which supposition concerning their fabrick appears to me the more probable, because fitted to explicate the matter mechanically, that is, intelligibly. For I conceive all the world of bodies, and their actions, is pure Mechanisme; and therefore 'tis requisite all explications relating to them, designed to informe, and not to puzzle, should be founded on principles of that kind.

And indeed though it be impossible to make so full a discovery of the small constituting particles of this as well as any other concretes, that we may have ground to dogmatize on them, they being much below the perception of our sight, though assisted even by the best Microscopes; yet since few of them act to our perception, singly, but to doe it must be associated into somewhat bulky

bulky concretions; which may possibly be allowed to make deductions from the observation of such, when we find them to convene in a familiar and natural way. Consequentially whereupon we may take notice (for the confirmation of *Descartes's* notion) of what the curious Mr. *Leewenhoeck* observed with his exquisite Microscope, as to the concretion of Niter, dissolved in water, upon evaporation (to be met with, *Philosoph. Transact. Numb. 173. Jul. 26. 1685.*) *As, saith he, The water in any place began to be evaporated I found many figures whose basis was square, and rising to a Pyramid.* And though there were other figures exhibited, yet it may very easily happen that upon a coalition of a multitude of these extremely small particles, in so confused a manner as must be upon an evaporation ( besides

fides that many of other kinds may affociate with them) variety of figures may well emerge from those fo convening, though the principal have the forementioned tendency. And besides, though the figures of minute ones might not be Pyramidal, yet it may be such as to fit them, from their congruity to one another, to affociate strictly into this; it being by many Chymical instances of the acting of bodies, salts particularly, on one another, obvious that these of very different makes doe, upon their collisions, when diluted in a fluid, unite into concretes very strict that have little or no cognation in their figures to either of those singly that went primarily to constitute them: So that when freed from their diluting moisture, which brought them together, and then pressed upon by the strokes of the  
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Elastical particles of the Air, they may possibly come to cohere so strictly ( supposing their sides smooth and flat, as it seems probable they are even from the obvious figure of the concrete; and is deducible from that effect of the Air in the much noted instance of two flat marbles ) and be so hardned, as to be fit to act ( their acuminated figure considered ) almost equally vigorously, as if they had been primitive ones, on Bodies not of the very closest texture. Nay since they are designed to act on such which have no very compact texture, for the most part; it seems congruous that theirs should be such likewise, to bear a proportion to them, which perfect solids of those bulkes and figures, that were primitives, would not.

'Tis true, *Descartes* assigns that figure to the particles of *Niter* to  
explicate



explicate the manner of its Accension, which produces Heat, when so modified; and that perhaps more violent than any other Bodies doe. But as 'tis sufficiently known that in many instances it much refrigerates; and there must be a natural reason for one effect as well as the other; I conceive that of both, however opposite, may genuinely enough be deduced from that fabrick, according to different modifications; and therefore may be presumed to establish the notion of that kind of figures. For in order to produce the latter they, by entring with their *apex*, as I just now said, into the porosities of the organs ( which they must do, if the point be very sharp, though carryed to them with ever so slow a motion ) and still piercing more deeply by degrees, may placidly enough retard the motion of  
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the substances therein agitated. And indeed to effect this a comparatively slow motion seems necessary ; such as agrees not only to the forementioned notion of Cold, but also both to the Air in general, which is placed in a boundless *expansion*, and therefore being not straitned must move calmly enough when not forcibly impelled ; and especially to these *Nitrous* particles, which being dissociated by others of different kinds one from another, and having ordinarily there no violent impulse, must, on the account of their make, move leisurely when carryed with the whole course of the mass of Air ; and the rather, since the resistance, which their concomitant substances make against the thicker extremity of them, must much retard their motion. Withal, if it happen that these pointed particles enter into  
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the passages of those sensible Bodies, they may be presumed so to strike against some of the fibres that constitute them, that they must from thence irritate them to contract themselves, and so the motion of the fluid substances in them must be effectually checked. But as for the production of Heat, another modification of them must be assigned, *viz.* a very brisk agitation from some external occasion; which happening, the *apex*, being more easily agitated than the basis, must necessarily describe a circle about it, which by reason of its greater bulk cannot be so easily moved out of its place, but only gyrate about its proper centre according to the direction of its cone; and by so doing the cone must needs strike very violently against such Bodies it meets in its way; whence a sense of Heat to

sensible Bodies must necessarily proceed, in regard the force of this agitation must be supposed to be greater than that of the moved particles in the organ: which too must be raised to a much more considerable degree, when great numbers of these particles conspire to the like motion; especially if minute accensible substances of other kinds are interspersed among them, which, both from their own disposition to be so agitated, and their determining a little these nitrous ones, whereby they may have room to begin their gyration, may promote this accension; as in the too fatally known experiment of Gunpowder. I must indeed acknowledg that the angles at the basis of these corpuscles, if they be Pyramidal, according to Mr. *Leewenhoeck's* observation, may hinder the gyration, *Descartes* suppo-

supposes, in some degree: but 'tis easy enough to conceive, that, as well here, as for the making his *globuli ætherei*, these angles, by the very brisk motion the *corpuscles* are put into may presently be ground off, and so they fitted for this gyration; and this much more easily than in that instance: because those primitive particles must be supposed to have been exquisitely solid, whereas these two have been *coagmentated* of some formerly divided, and only now *cohering* from the forementioned correspondency of their sides.

So that the difference seems to consist in this, that to produce Cold 'tis requisite that these nitrous particles should both move singly and placidly, and also insinuate themselves amongst such substances as may confine them, being once entered,

ter'd, on every fide, and' fo hinder the above mentioned gyration: Whereas to ingender Heat 'tis neceffary that they fhould be, both in greater numbers, be briskly agitated, and generally move in a fufficiently yielding medium, and at only fuch a diftance from one another, as that in their gyration they may beat off one another with their points; from whence the motions of others among which they move muft needs be confiderably increafed; and withal they either previously require, or, if the force of the agitation be the greater, make in almoft ever fo clofe a roome a confiderable fpace for themfelves to move in.

But perhaps an objection may be raifed againft what I intimated a little before concerning the ordinary motion of the Nitrous, particles in  
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the Aire, which I suppose to be carryed with their *Cones* forwards: For it may be urged, that, being very confusedly moved, and amongst fluid substances, sometimes the Basis, and sometimes the sides, may in such an agitation be as well carryed so as the *Apex*, and then the consequences of their insinuation, which I deduce, cannot have place; the assigned figure being that which fits them to produce the effect. To which I returne, first that though some may in their motions, when brisk, so appeal to Bodies as is objected; yet there being greater numbers, than ordinary, in Frosty Seasons floating in the Aire, 'tis probable that some, at least, of them will be carried as I suppose. But secondly, it seemes to me probable, that being moved placidly enough (according to the supposition) their

natural tendency must be with their points forwards: For in that posture they both find less resistance amongst those against which they move, and are supported in their motion by other lateral ones crowding upon them; and also those which are moved behind them impell them the more easily forward when they impinge against a flat surface (as the *Bas*is is supposed generally to have, or at least what approaches toward it) than against that of any other figure; and therefore determine them to carry their *Apex* as I said.

But whatever their make be, 'tis both generally supposed, and seems to me very probable, that without these the Air could hardly be vital. For some substances that are fit to be agitated, but unapt to cohere, seeme requisite to be intermixed amongst



mongst the various parts of our Bloud, and other liquors, which may, by their vibrations, whether occasioned from without, or from the motion of our spirits, keep them from too close complications, which that many of them are much subject to is very obvious: and these I take to be those usually called *Nitrous*.

But though these in the Air, may have a very great, if not the principal, influence, on any Bodies they can enter into to produce many effects, but particularly, on sensible ones, Cold; yet both the Elastical particles and also the steams before mentioned, with which the *Atmosphere* is considerably stored, must much concur to any of them; these on the account of their great variety and irregularity, whereby they are apt to be determined to  
very

very differing motion, and thence to sollicit the particles of the Bodies they act on to the like, for the *Nitrous* ones to enter; and those by their expansiveness enlarging the passages for them. So that when the Air from any occasion happens to abound more than ordinarily with *Niter*, the assigned effect of it may be presumed easily to be produced, and especially on our Bodies, which being of a contexture tender and yielding enough, must be injuriously affected, if either the motions, or other disposition of its particles prove to be disproportionate to the parts of them, or substances contained in them.

Therefore to enquire, *Secondly*, how our Bodies, but particularly the *Brain*, come to be thus injuriously affected from hence, we may take notice that the Air (with the  
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substances it carries in it ) exerts it influence partly on the liquors, and partly on the solid parts.

*First*, for the liquors; we may consider briefly how it comes to be admitted into, and being so, after what manner it acts upon, first the Blood, and then the nervous juyce ( to omit the rest of them, as little conducing to the present speculation ) and this as well amicably as noxiously.

*First*, As to the Blood ( which is most considerable as to quantity and supplies the matter to the nervous and the rest of the juyces ) we may take notice, that though the Air may even by contact affect it in the surface of our Bodies, as considerably pressing on us, and so perhaps arrest or variously determine its motion in some degree, yet it must principally do this by being admitted

ted into it. This admiffion feems obvious; fince, 1<sup>ft</sup>, living in it, we cannot take any, either meats or drinks, but fome Air will be admixed, and fo be conveighed into our Bloud with them. Befides, 2<sup>dly</sup>, it feems not improbable ( though it have undergone fome conteft ) that fome of the finer parts of it may be admitted, in infpiration, farther than barely the cavities of the *bronchia*, fince it muft be owned there are veffels from the little glandules difperfed throughout them, which tranfmit from the Bloud there: and whether thofe veffels may not receive fomthing ( tho' not fo much ) into them upon infpiration, as well as caft forth by expiration, may deferve to be confidered, fince the Air comes into the *Lungs* with fome violence; and they, being placed in fo warm a fituation, may ( befides the

the distention upon inspiration ) be presumed to be as well lax enough to admit a subtil substance as eject a gross one: and it seems not altogether improbable that nature might design this reciprocation of motion for that end partly. But withal, 3<sup>dly</sup>, the pores every where in the skin seem well enough adjusted to admit somewhat from the Air, as well as convey forth those very gross impurities, which many times, if not very usually, pass forth without any trouble. And if it be objected that the transpiration continually proceeding from within must hinder any admission from without by the same vessels ( which notion heretofore seemed to me to have great weight, as well in relation to these, as most other vessels, and liquors in the Body, though, upon farther thoughts, it requires some  
limi-

limitations, which belong not to  
 this place to be laid down ) it may  
 be replied, that this transpiration,  
 though it should be supposed con-  
 tinual, is not in the same tenour still;  
 so that when it proceeds minutely,  
 there may be an admission perhaps  
 from without, between the parti-  
 cles of this gross and slowly moved  
 matters in vessels patulous enough;  
 when we consider both the great  
 pressure of the *Atmosphere*, which  
 may easily enough be presumed on  
 that score to intrude some particles  
 of the Air between them to fill up  
 the spaces left by the exhaling va-  
 pours; and also the cessation in some  
 degree of the extrusive motion, whe-  
 ther proceeding from the expansive-  
 ness of the evaporating matter or the  
 too much contraction of the parts;  
 both which remitting, the resistance  
 is less, and the room more, for the  
 ad-

admission of those. Being thus admitted, 'tis obvious to deduce, from what was intimated before, how it ordinarily operates on the Bloud, *viz.* that partly by the insinuation of its elastical and other irregular particles among the parts of it, partly the interposition as well as lancination of the nitrous, the ramous, and other grosser, being kept in a continual agitation, do both undergo due comminutions, and also are hindered from too closely adhering, and thence as well from stagnating in the wider vessels, as obstructing the capillaries and interstices between the arteries and veins. But such an agitation being necessary to it for the keeping up its vital crasis, it may easily be inferred, that if such Air be admitted as shall overmuch check this agitation, the crasis of it must come to be much altered, and those  
 parts

parts which were before diffociated by the briskness of their motion must, being considerably ramous, lay hold on one another, and so either become grumous, or create a viscosity in it, which, once begun, is not soon, nor easily, corrected; these particles clasping one another too firmly to be quickly unlocked by the permeating spirits; whose activity likewise these viscous substances are apt to elude by their lubricity, thence obliging them to slip by them; or else inviscating them.

*Secondly*, As to the nervous juyce; it being made out of the Bloud, must therefore, in some degree, undergo impressions analogous to what are made upon this from substances admixed with it; whether we consider it in its due, or depraved, state: since it may be easily imagined that  
some



some of the admitted substances of the Air, before mentioned, may be deposited into the nerves at their original, together with the true matter of that juyce: and besides if the Bloud in general be once become viscus ( from whatsoever cause ) 'tis scarce possible, but that some part of such a matter must in the act of secretion pass into the nerves: so that the Air, in some constitutions of it, much disposing to viscosity, its influence therefore must be interpreted to be partly on this juyce at such times. But moreover, I see no reason but some particles of it may when more than ordinarily abounding with such substances as are subtil and active, even through the pores be admitted into this liquor; our Bodies being every where permeable to subtil substances; since I conceive, they in a due  
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proportion are necessary even to the due spiritualization of this juyce; and therefore, for its excitation towards that may require to be admitted, partly, a nearer way than that round-about one of the chyle.

But, *Secondly*, The Air's influence must be acknowledged to be very great on the solid parts likewise; as both immediately touching upon some of them, and also, by reason of their firmness, being longer retained by them, when once admitted into their porosities (which, by the mediation of the Bloud, besides the other ways mentioned, which are applicable to these as well as the liquors, 'tis easy to imagine its particles may) than in those fluid substances. So that in the fore-mentioned suggestion of its superabounding with noxious substances, they must be much disposed to be  
affected

affected by it. And indeed there seem to be none, even of the most consistent parts of our Bodies, but are pervious enough to, and consequently apt to be acted on by, such penetrating substances.

But among them all none seem so liable to receive impressions from them as the *Brain*, on the account of its tender constitution. For, tho' Nature hath placed so strong fences about it, that perhaps 'twill hardly be admitted that the Coldness of the *Ambient* can greatly prejudice through them; yet that it may, by the mediation of the Bloud passing through it, is, I suppose easy enough to be allowed from what has been said. But besides, there seem two or three other wayes, by which, in such a constitution of the season, it may be injured; *viz.* *First*, By the Air's affecting the *mammillary* processes,

cesses, as it passes briskly by them upon inspiration: which being considerably large nerves must ( besides the consideration of the impetuosity of the Air's motion in that circumstance ) be acted on by considerable numbers of its particles at once, and so undergo a strong impression, which may easily enough be conceived to be propagated to the *Brain*, partly, by disturbing their regular tonick motion, which must, from their tensity, be continued up to their original; partly, by the ingress of too many of the lancinating particles of it into them; which besides the fixing, or dissipating, the animal spirits ( which I conceive to be much of the nature of volatill salts ) may disorder the tone of these nerves first, and then ( by the continuance of the impulse of those behind, which have the same ground  
to

to attempt an entrance) that of the *Brain* it self; which, being more tender than the nerves, must therefore, when the cause of the disaffection reaches it, be proportionally injured. A second way I conceive is at the ears, whose outer cavity going deep seems to be, in part, contrived for warming the Air, that it may not by its Coldness disaffect those exquisitely sensible auditory nerves and the membranes, upon whose due tone and tensity as the sense of hearing seems mainly to depend, so must it be much impaired if so unusual impressions are made upon it by intensely Cold Air, and besides those nerves being thence so disaffected must by their contractions convey the like motions up to the *Brain*, and so disturb and weaken it. And I formerly knew a very Learned person, who had a

total and irremediable deafness, that was caused, as he told me, by a journey taken in a very keene frost over the Mountains in Wales: to which I remember not whether any *Apoplectick* distemper succeeded, but the instance at least evidences the great effect of intense Cold upon the nerves, which had it lasted long, 'tis to me probable that by being propagated up to the *Brain* it might have produced either that or other nerval distempers. Another way, whereby I conceive the Cold Air may be injurious to the *Brain*, is at the extremities of the nerves in all parts of the skin, which having (as must be owned I presume) apertures there, may possibly admit some such subtil and lancinating substances, as I have supposed to be constantly, but in frosty seasons more copiously, carried in the Air; and  
being

being once admitted may, on the same ground as I have urged in relation to the olfactory Nerves by consecution come to affect the *Brain* it self : But though their tracts are very long and small, and so there cannot be a proportionable influence, as in those; yet their great numbers, and the consideration that they are on every side pressed upon by the Air, may perhaps be thought to Compensate for that defect.

But this pressure of the Air on the surface of our Bodies (which I distinguish from that on the olfactory nerves on this consideration, that in one case 'tis uniform, depending only on the weight of the Atmosphere, or such general motions in it, as make it act uniformly on all parts of the surface of them, which by their make, and private motions, determine it not otherwise; in the

*other*, some part of it is moved with a greater violence, from the dilatation of the parts designed for Respiration; whose cavity therefore being to be filled in proportion to that dilatation, it must happen that that portion of Air that does it must have brisker agitation than the rest of its masse, and make impressions accordingly) this pressure, I say, may prove chiefly injurious to the *Brain* by its acting on the *Nerves in the Eares*: Because they, being terminated at a cavity which is still kept warmer than the rest, by the steames continually exuding from every side of it and for some time somewhat detained, there must therefore be more open, and consequently more liable to injuries if an extraordinary occasion happen, such as I am instancing in, to make an impression on them. And this must happen rather to tender



der Bodies, and those who accustom themselves to keep much within doores, than to the more robust, whose employments expose them much to the Air at all seasons, both on the score of the comparative flaccidity of all parts in them, and the defect of a due digestion in their blood and other liquors through want of due exercise, which must dispose them to be put into confusion when violent causes come to excite it ; and experience shewes that such persons of all others are most obnoxious to the alterations of the Air.

So that the manner of this action seems to consist in the penetration made by the Nitrous particles (principally) of the Aire upon the *Fibres* of the *Brain* (for that as well as all other solid parts must consist of *Fibres*) which thereby undergo some, how-

however small, solution of continuity ; and either the little cavities of those *Fibres* (for I think the *Economy* of our Bodies can hardly be mechanically made out without supposing them all to be Vessels, though our sensories cannot determine it) become straitned, or their sides perforated ; on the account of either of which, they cannot duly either receive, or retain, and consequently not regularly transmit, the substances destined to each part which is to be respectively supplied by them. In that continuity, due confirmation, & repletion of them, I suppose the Tone of the parts to consist : and therefore when any thing perverts any of these requisites to it, as in our present case, all the consequences, emergent from the impulse of the blood or other liquors disturbed in their motion, may be expected.

Now

Now such an *Atony* happening to be in so very tender a part as the *Brain*, cannot therefore easily be rectified, but may continue much longer, than if it happen to other parts whose *Fibres* being stronger, and functions fewer, must on both scores (*cæteris paribus*) sooner and more easily return to their natural constitution. And not only the reason of the thing, but dayly experience, shews it; that whereas most other parts of our Bodies, having once received any injurious impression, as by falls blows, &c. do, after fit remedies used, return to their due tone quickly, the cause once removed; the *Brain* on the contrary long retaines its weakness if once injured, though for the present releiv'd in some degree: as, for instance those that have had an *Apoplectick* fit once, doe many times, on what-  
 foeve

soever light occasion either find a return of it, or at least undergoe a considerable weakness of their intellectual faculties, not to be corrected but by a long and constant regularity, if it be at all: and the like is observable concerning those who have been seized by *Vertiginous* and *Hypochondriacal* distempers ( which I take to be properly Nerval, and to spring from the *Brain*, or its liquor, disaffected) from which few happen to be perfectly freed: their imagination indeed, being disturbed, disposing them to be too immorigerous.

So that I conceive it may be inferred, that if the Ambient Air come to have a great degree of Coldness, especially if it continue long, both the forementioned disposition of the Bloud to supply matter for *Apo-plexies* must be introduced, and also such a debility may be impressed on  
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the tone of the *Brain*, that they may much more readily invade, if the ordinary (though at other times innoxious, for the most part at least) occasions happen to bring these dispositions to effect.

Now 'tis known that the Winter of the year 1683, (from which I date my *Ara* of this frequency of *Apoplexies*) was so intensely cold, and that cold of so long continuance, that no mans memory living could supply him with a parallel year; and there was no need to repair to the Northern Region to make experiments of freezing spirituous liquors in order to find out the extent of this effect of it: since which time it may be observed that this distemper has been so rife.

But since 'tis requisite the Assertion should be established as much as possible by due observations, it  
came

came into my thoughts to examine the *London* Bills of Mortality; which may be presumed to be a standard for all the Kingdom, as well as all other places where the same constitution of the Air has happened. And though it may be urged, that the accounts of diseases in them are taken by persons who are not Judges of those things; yet many diseases carrying, by their obvious symptoms, such evidences of their nature, that 'tis almost impossible to mistake them, and above all, *Apoplexies*, as before was suggested; if the matter of fact (whereof the Searchers are Judges) as to the number of those that dye suddenly (and 'tis great odds those, for much the greatest part, dye of *Apoplexies*) be clear, as I suppose 'tis acknowledged by all, I see nothing but it may be brought to establish the *Hypothesis*.

*thesis.* Having therefore looked into the general Bills for near Twenty years past, I find the account of those that dyed of *Apoplexies* and sodain death ( which are there, and, I conceive, may passably enough be reckoned under the same class ) to stand thus.

<i>An. Dom. Apop. &amp; sud.</i>		<i>An. Dom. Apop. &amp; sud.</i>
1670 -----	79.	1679 ----- 103.
1671 -----	63.	1680 ----- 95.
1672 -----	65.	1681 ----- 94.
1673 -----	84.	1682 ----- 100.
1674 -----	101.	1683 ----- 108.
1675 -----	86.	1684 ----- 152.
1676 -----	84.	1685 ----- 112.
1677 -----	66.	1686 ----- 129.
1678 -----	83.	1687 ----- 110.

From whence I think the probability, at least, of my *Era* may be inferred, whatever may be thought of

of the notions that are brought to give a reason of it. For the great increase of number in the year 1684. must evidence that; and it seems obviously deducible, that as some great and general cause from the constitution of the season must influence such accidents; so that assigned, from the Coldness, may have that energy here; since both 'twas so remarkable, and nothing else appeared (either upon my own, or any others observation or notion, so far as I have yet learnt) fit to stand in competition with it. And from comparing the accounts of the subsequent years with those which went before, there seems reason enough to suppose, that since the indisposition lasted (but in somewhat a lower degree) though the external occasion have ceased, the weakness impressed on the *nervosum genus*,  
according



according to what has been before deduced, is not yet obliterated. And indeed if we take notice of a disease of another denomination in the same papers ( which by the dreadfulneſs of its ſymptoms is almoſt as evident as the *Apoplexy* ) viz. the claſs of *Convulſions*, we may obſerve the effect of that impreſſion on the *Brain* to be ſo farr from vaniſhing, that it rather ſeems to be in the increaſe tho' the ſymptoms that declare it are altered: that claſs ſtanding thus.

<i>An. Dom.</i>	<i>Convulſ.</i>	<i>An. Dom.</i>	<i>Convulſ.</i>
1670 ----	1695.	1679 ----	2837.
1671 ----	1650.	1680 ----	3055.
1672 ----	1965.	1681 ----	3270.
1673 ----	1761.	1682 ----	3404.
1674 ----	2256.	1683 ----	3235.
1675 ----	1961.	1684 ----	3772.
1676 ----	2363.	1685 ----	3420.
1677 ----	2357.	1686 ----	3731.
1678 ----	2525.	1687 ----	3967.

So

So that though the flaccidity, impressed on the *Brain* from that occasion, may be in good measure by this time abated, and unless the like, or some as forcible causes, happen again may, 'tis to be hoped, quite cease (and I suppose it may be observed that the forementioned frequency of *Apoplexies* is a late somewhat abated) yet it may however have been so disordered in its tone, as to make secretions of substances out of the alluent Blood (which carries matter for those of very many sorts) which may become so disagreeable to the nervous liquor, as necessarily to produce those terrible symptoms, which tho' they kill not so immediately, yet many times prove as certainly fatal at long running. And the great numbers of vertiginous and other nerval indispositions, which I presume

sume other Physicians as well as myself usually meet with, may very well argue some considerable indisposition impressed on the *Brain* more of late than formerly which must give a rise to them. And indeed if we observe it we may find (at least I have) that most *Feavers* of late years, and even at this time, have been attended with nerval Symptoms, as either *Tremors* or *Convulsive* motions in the *Tendons*, or else *Comatous* affects, *Deliria* (for the most part slow) or some others of this original: And the Symptoms mentioned by that most curious observer of the changes of diseases, my Learned and Worthy Friend Dr. *Sydenham* (in his *Schedula monitoria de novæ Febris ingressu*) to discriminate the *Feaver* of this new Constitution from those foregoing, are obviously those of the *Brain* or Nerves

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affected as may be easily collected by those that cast their eye on the History of it he lays down.

So that the notion is not to be restrained to *Apoplexies*, but ought to be carried farther to many, if not most, other nerval indispositions, which I conceive, may be occasioned by the same general cause. For if it be determined to act on the *Brain* to its weakning (as I have endeavoured to demonstrate intense Cold is) the constitution of it and its appendices, being very much differing in several persons, it must follow, that diseases of various kinds and denominations may happen, according as the organization of either the *Brain*, or the *Systema Nervosum* (which may be possibly concluded to be the whole Body, except the liquors and *Parenchymata*) happens to be different in some from what it  
is

is in others: And indeed the *Brain* in all persons, who have even the most firm constitution of it, being yet of too tender a one to resist all impressions made by so powerful a cause as the forementioned disposition of the Air was; & being so hard to be restored when once injured; & if that be not fully done, easy to be afresh affected even by much less powerful causes of many other kinds, which frequently happen upon the various mutations of the Air; 'tis no wonder that the Bills should be so filled with Convulsions, as well as that other nerval indispositions should now adays so much invade.

But in relation to the numberousness of Convulsions (mentioned, as I said in the weekly Bills) it being objected that their fatality happens, probably, most to Children; which, having been born since that frosty

winter, cannot be presumed to have been influenced by it ; I answer, first, that the supposition is precarious, since the Bills make no such distinction; so that it may be not altogether improbable that though that mortality may have been most among them, they being the fittest subject of such diseases, yet adult persons may withal have gone to make up the number of the increase: and I see no reason but that since it must be acknowledged some elder persons have before that time dyed of this disease, they must proportionably contribute to the number now, unless the contrary can be shewn, or else some more probable cause assigned, than what I am going to give, why more infants must dye of it now than formerly. For, secondly, there seemes reason that parents who have received a morbid impression

impression on a part of that consequence, that the *Brain* is, to the production of seminal matter, and thence the formation of the *Fætus*, as to the necessary functions of their proper life, may propagate that to the children they beget or bring forth, as well as dispositions to the *Gout*, *Stone*, *Consumptions*, or other confessedly Hereditary diseases; which too, are most of them nervall. And this impression on the *Fætus* must, in probability, happen principally on that part of it, which being chiefly influential on the rest of the body must have its *Stamina* laid as soon as any other parts if not before them all: which too from the congruity of substance this has with the analogous part in the parents, which has the principal effect in the production, may be supposed to be principally affected in the Child. And the

*Brain* having been weakned in the Parents, the reason seems more over much stronger for the production of these than any of the owned *Hereditary* distempers, if the Parents have ever formerly had *Convulsions* (which very many have whilest Children, as is generally observable; and I see not but that this is sufficient to make and denominate the same disease, in the Child that springs from such persons, *Hereditary*) since here is so powerfull an operating cause superadded to a seminal debility and impression.

But 'tis objected by a very ingenious person against the *Era* I assume, 1<sup>st</sup>, That the increale of *Apoplecticks* in 1684 being but 44 above the number of those that dyed of that distemper in 1683 is too small an increale to be taken notice of for establishing it; 2<sup>ly</sup>, That there have  
been



been two or three great Frosts within the 18 years I mention, without any observable increase of *Apoplexies*; 3<sup>d</sup>, That (against my suggestion of the great increase of *Convulsions*) 'tis notorious that any one, that has but the least *Spasme* before death, in the Bills dyes *Convulsive*, besides those that dye of other distempers, particularly the *French Pox*, whose credit their Friends are willing to save, and so give them in as dying of *Convulsions*.

To the first of which objections I reply, 1<sup>st</sup>, that I thinke 'tis not the number of the increase *in general*, but the *proportion* to that of former years that ought to be considered in this matter. For though the number in it selfe be but small, yet comparatively to the rarity of the distemper I take it to be so considerable, that few diseases flowing from  
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the Anomaly of seasons on account of the first qualities, except *Feavers* (which somtimes, I conceive, prove epidemical, even without what we call Malignity) exceed it; being not much under a third part more than that of those that dyed the foregoing year, and by much more than a third exceeding that of several of the years cited, and more than double the number of those that dyed in some of those years. So that there is to me a great deal of reason to think the *Cold season* influenced that increase unless some fitter cause can be assigned. 2<sup>dly</sup>, That those distempers that lye in the *nervosum genus*, viz. the solid substance of the Body (or even in the root of it, the *Brain*, whose texture yet is finer and more tender than that of all the rest of it) or in the Liquors that are contained and carried in it, being

being seated in a matter less *Heterogeneous* and more removed from the briske agitation impressed by the Heart, as they are more difficult to be introduced, so a smaller excess in the number of them amounts to a greater proportion comparatively, than where there are those ready causes of a commotion, as there are in the diseases which are generally called *Epidemical* (as malignant fevers, pleurifies, angina's, &c. from the indisposition of the season.) For these being seated in fluids which are very *heterogeneous* and *laxe*, and agitated not only with a fermentative but brisk circulatory, and thence very confused, motion, are therefore easily put into disturbances from external morbid causes; the matter of which, if active (as there are particles enough amongst those we converse with

with that are ) may easily insinuate into the Bodies of most persons, especially those who are not of a very vigorous constitution , and may thence excite feavers in them so determined in their symptoms, as this matter is disposed to affect; whereas those that are founded in the *nervosum genus* require, on the score of the mentioned conditions, a long continued action of the morbid causes, to induce those impressions that must occasion them. From whence,

( To answer the *Second* objection ) it seems to me no wonder that none of the *former Frosts*, referred to in the objection, should introduce distempers ( though perhaps of the nature, yet not ) of the number of those under consideration. For none of those in my memory; nor, so far as I can be informed, in that  
of

of any man, were either so violent or long lasting as this, and consequently the degree of debilitation impressed by them, could not be so great either on the *Brain* or *Bloud*. But perhaps, if a due examen were made ( which I have not the opportunity now to doe ) it might be found that nerval indispositions of other denominations may have succeeded them, answerable to the degree of the impression. However this impression ( which, I conceive, from the grounds before laid down, must be somewhat ) having not been obliterated ( which it may not perhaps in many years ) when this great one invaded, might facilitate the effects of it, which without such a *procatarxis* might have been the less influential on our health.

But as to the third objection; I conceive 'tis no more than what  
may

may be urged against that symptom in the Bills from their beginning. For I do not think that either the searchers, or others who give them the account, were more skilful formerly to distinguish between those distempers we call *Convulsions*, and *Casual Spasmes*, than now. And why there should be more of this latter kind now than formerly, I cannot conceive, unless they be the effects of true *Convulsions*. So that I see nothing but that the assigned compute may hold good; especially since the increase is so very great that nothing but a real fixed cause can introduce it. And as to what is urged of the *French Pox*, &c. being put in under this Class, the answer is the same, since the same reasons have always been for the concealment; and 'tis known the *Pox*, and its infamy too, has been

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fiderably longer in the world than Weekly Bills, which are not of an Hundred years ftanding.

From thefe confiderations put together, you fee my fence of the question propofed; to which I am fure you expected not fo tedious an answer. And I affure you I defigned not this prolixity: but feveral deductions ftill falling in which to me feemed requifite to clear the notion, I am fure you will not expect apologies for my doing that which your felf have occafioned.

But fince you farther require the methods of Prevention and Cure of this diftemper, which I have either ufed or think requifite; Though after what fo many Authors, and particularly Dr. *Willis*, have written on this fubject, it feems altogether fuperfluous to fay any thing; yet, to let you fee how ready I am to comply

ply with you in this as well as your other desire, I shall venture at least to give you my thoughts in general concerning them; together with my reasons, such as they are, of the administrations to be proposed, to justify my dissent from such, who in any of the particulars think differently from me.

But first, though not pretending to write an exact treatise of *Apoplexies*, but only to give an answer to your questions, you are not to expect I should congest Prognosticks, according to the custome of Authors when they propose to write solemnly concerning any diseases; yet I conceive 'tis requisite I should lay down, or rather recapitulate, one or two that respect the fatality: more indeed to excuse Physicians (who are generally liable to be taxed if success attend not their endeavours)



vours) than for any solid and useful information they can bring; since the cause of it cannot be certainly known but upon dissection. And

First, if an *Apoplexy* proceed from any considerable effusion of blood in *Specie*, 'tis, as I intimated before altogether incurable, since the tenderness of the part is such that it cannot resist the force of the protrusion behind. And since even any stop in the Sanguiferous vessels will, if not presently removed by Phlebotomy or other due remedies, so distend them that either an eruption or stagnation must quickly follow, 'tis not at all to be wondred at that so few escape; since so few are convinced of (what I take to be) the true remedy where there is a possibility of recovery.

Secondly, that likewise which proceeds from a *Polypus* must needs  
prove

prove as fatal, both from the difficultly diffoluble nature of that substance, and the shortness of time medicines (if such there were) that should effect the dissolution, are allowed to exert themselves in: the blood, as I just now said, for want of motion quickly stagnating and growing grumous in any part where 'tis stopped, and so hindring the motion of, and alike affecting, the rest.

To which yet, thirdly, give me leave to subjoyne; that if the Pulse continue any thing strong, the probability of recovery is much the greater, since 'tis an argument the *Brain* is not wholly overflowed, but that the mass of blood yet continues in its channels, and produces the distemper only by distention: so that when they shall by due administrations be freed from it, there is hope the *Brain* may return to its  
pristine

pristine condition ; at least in some degree. But yet,

Fourthly, that those who have escaped one fit, are in very great danger of a return ; since (as I have before alledged) the *Brain*, having been once injured, is, by reason of its tender make, so difficultly reducible, in all respects, to its former Tone ; and therefore from any, even slight, occasion be afresh more easily disordered. Therefore it very much concerns those who have once escaped that danger, or even that of a great *Vertigo*, or other *Cephalick* distempers, to use a good regulation of themselves for the future, and also to persist long in the use of such corroborating means as may at last (*Deo annuente*) perfectly restore it, as well as keep the blood in a due crasis, and prevent all antecedent causes. Which advice yet very few

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are

are apt to follow ; two many being apt, when once in some degree recovered, to imagine (and suggest too) that Physitians urge that more for their owne advantage than theirs.

Which premised, I conceive, first, for Prevention, that these two general Indications ought to be proposed. The removing the Antecedent cause, and the corroborating the *Brain*.

The former is to be answered, *1<sup>st</sup>*, by general evacuations of humours, whether Laudable, if they be congested in too great a quantity, or Peccant: *2<sup>ly</sup>*, by keeping up, or, if it be depraved, restoring the blood to its due crasis.

*1<sup>st</sup>*. As to evacuations; *Phlebotomy* seems to deserve the first consideration; since, as I have endeavoured to make it out, 'tis either the congestion of the blood in the sanguiferous

guiferous vessels of the *Brain*, or its inundation upon it, that is the most general containing cause of it. So that all persons of a Plethorick habit of Body if fearful of this distemper (Fear, by occasioning the contraction of the *Brain*, the seat of our apprehensions, if not determining the blood to it, at least causing a check of its motion through it, and so a congestion in, or effusion out of, its vessels) as well as those, whose blood, from other symptoms, or the emission of some of it, may be collected to be viscous, especially if they happen, with distention of the Veines and Lassitudes, to be vertiginous, or inclined to pains in the head, ought to take so much away as may, in probability, prevent too great a distention here, and this not only at such times of the year, when the blood is more apt than usual to

rise into a Turgescency, as in the Spring and Summer, but at any time when they occasionally find it to be so disposed. And though many may (& are indeed used, to) urge, that not letting blood at all they have hitherto escaped this, as well as other distempers, when some have been ceased, and dyed too, notwithstanding such their care ( which argument too, by the way, may be urged by many of vigorous constitutions against all precaution, against all diseases, and for a liberty for all debaucheries.) Yet since many have fallen into it, who might probably by Phlebotomy have prevented it, as well as that many have by it found present relief when actually ceased 'tis but a secure caution to use the most probable means of prevention; since though all constitutions are not alike, and some may be sensible

fible of weakness for the present (which yet quickly goes off by a little subsequent care) yet experience shewes there are very few but find, though they loose very large quantities of blood, they quickly regain it, as (to omit the reasons of it, as less proper for this place) beside abundance of instances that might be brought of those, who, free from the too general apprehensions of the danger of loosing it, have had it designedly taken away in large quantities, Spontaneous Hæmorrhages, and those from large wounds, might convince persons unbiaſſed by their own, or others, unaccountable fears. Therefore I should propose that any persons who dread this disease, whose blood has not been depauperated by preceding ones, especially if their appetites be generally good, and they use not store of exercise

(filling their veins by the one, and not taking care proportionally to empty them by the other) should take away blood at least every Spring; though oftner if occasion require; and much the rather if they accustom themselves to (that frequently fatal custome of) much drinking of Strong liquors; so to keep both the sanguiferous vessels from too large a distention, and the blood more calme. Twenty ounces I take to be about a middle proportion for most to loose; which may, I suppose, bear the proportion of about a twentieth part to that in most Bodies, and not very much less in most, and I believe can do none (under the forementioned circumstances) any hurt, but much good to most, by securing them from the danger of this, as well as many other distempers.

Besides



Besides *Phlebotomy*, I take moderate *Purging* to be requisite, in order to carry off viscid and other humors that, from the foresaid impressions made on the Blood as well as the *Brain*, are apt to be congested; especially in the Bodies of sedentary persons. This may be done usually Spring and fall; provided that it be neither attempted with too violent medicines, nor too long continued, nor too oft repeated (which ill custome yet many *Hypochondriacal* persons, I have met with, will not be dissuaded from) least instead of taking away the *luxuriant* humors, these medicines, by too much exagitating and disturbing the Blood, introduce the distemper they are given to prevent. But if the stomach be oppressed, 'tis requisite it should be discharged upwards before medicines of the contrary

trary tendency be given; since *catharticks*, as they can only carry a way thence a small part of that clogge that causes the symptom (their irritation not being sufficient in comparison with the *emeticks*, to make it contract it self for a total discharge) so may likewise take a long with them part of that into the Bloud; in regard they themselves must be carryed into it by the way of the *Chyle*, to effect the separations of those substances, we find they occasion a discharge of, from it. And indeed the effects of vomiting are very extensive towards the preventing these as well as many other, especially nerval, distempers. For besides the freeing the stomack from any oppressing matter which 'tis very apt to congest, and which, whilst lying there perverts digestion, by either hindring

dring the eruption of, or allaying, or else depraving the liquor designed to exude out of the glandulous coate of it into the cavity, which I suppose to be the principal digestive ferment: so that digestion being, by the removal of this matter, rightly performed, from the depravation of which most diseases spring, the cause of them is thus cutt off; I conceive the irritation, and concussion, made by an emetick upon the nerves not only belonging to the stomach, but ( by the consent of the whole nervous systeme ) all the Body over, and upon the *Brain* it self, must occasion them to contract themselves to the discharging of whatsoever fills, or is disagreeable to them.

Evacuations by Urine may be likewise procured by those who are of a gross habit of Body, or whose  
Bloud

Bloud is of too close a texture or too viscous; and may be used by such familiarly ( premising those forementioned ) either by impregnating drinks for common use with *diureticks*, of which practical Authors have store, or by taking fixt, volatil, or acid salts ( all which are *diuretical* in relation to some or other constitutions ) or other more complex ones, as the particular constitution of each person requires, even with our common meats and drinks; they, if fitted to the several *dyscrasies* ( for all are not proper for all indiscriminately; those who abound with acid humors needing alcalizate salts, either fixed or volatil to retund them, or others of an analogous effect; as others whose Bloud, by reason of its too highly exalted sulphureous parts, is apt to be overmuch exagitated, as  
 also

also those in whom even the volatile salts are too brisk and acrimonious, require acids to mortify them) raising generally no commotion in our Blood, but diverting the course of it from the *Brain* which 'tis too apt to take. For partly by the congruity their particles have to the secretory passages in the Kidneys, in order to enter into and open them more than those in the other secretory parts; partly by the fusion they make of the Blood, and the reducing many parts of it to such bulkes and figures as fit them to enter likewise; partly by their action upon the nerves and their liquor ( which I suppose to be the determining ferment in all mixt secretions ) on the account of their angles, which fit them to vellicate and incide, as also to accelerate the motion of any liquors they come  
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to be mixed with; partly by absterging, from that inciding power, any obstructing matter, that may lye in the habit of the *Brain*, as well as any other parts, between the extremities (or term of denomination if they are but continued vessels) of the arteries and veines; they may very well, I conceive, both make the Bloud more apt to circulate more universally, and also direct the course of it to the Kidneys, in regard some parts of it being continually, and more copiously than usual, thus taken off from it, the rest must take its course, from other parts where 'twas apt to stop, hither: it being known that it flowes most thither, where it finds apertures fit to let it, either in specie, or any of its parts goe forth.

Those evacuations likewise by sweat may perhaps be sometimes attempted

tempted with due caution; but neither indiscriminately by all persons, not at all times; and require more than most others the judgment of a *Physitian* to regulate them. For if medecines to procure it be given when the Blood is of a texture not open enough ( which both frequently it is, especially near the beginnings of most distempers, and which all persons are not judges of) or when too *heterogeneous* substances abound in it, they dispose it many times more readily to fix upon the *Brain* and nerves, than to part with its noxious particles at the designed secretory parts; and a brisker motion being thence impressed on it, the confusion of its parts must be increased; and so if not an *Apoplexy*, yet other distempers, as certainly, though more slowly, deadly ( at least very dangerous and hard

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to be removed) may be introduced. But this ill custome of forcing meats (whether by inward medicines or outward application) being so common nowadayes; as I am satisfi'd that to this regulation are owing many contumacious distempers which by calming, instead of exagitating the Bloud a little disturbed, would quickly have gone of, so 'tis fitting that those should be admonish'd of the ill consequences of such a method who, ( I will beleive ) out of charity ( which yet would be more fitly employed otherways ) adventure upon it, especially near the beginning of feverish indispositions, before the morbidick matter is digested, and fitted to secede ; as well as the multitude of pretenders to *Physick*, who without a due knowledg of the grounds of *Physick* ( which those  
that



that industriously study it, know are not easy to be attained) make this their sacred anchor when they know not what to doe.

Another sort of evacuations for prevention may be proposed, *viz.* By Fontanells. But though these look speciously, and many are fond of them, and indeed they may be possibly useful to such who have escaped out of one fit, as a constant draine, to divert some humours from the *Brain*, which, by too much relaxing, or otherwise indisposing it, might occasion returns; this part requiring thence, as I have deduced, a long time, and diligent regulation, to recover its native tone, and so may need all manner of diversions as well as other assistances: Yet to persons, free from other indispositions that require them, I should think them, if not  
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in some degree prejudiciall, by drawing away some part of what should be retained, at least superfluous, the humour evacuated at them bearing usually but a small proportion to the dayly supplies brought into the blood, which therefore may become much depraved for all the assistance these can give; especially in regard the evacuation is not of a peccant humour in general, but made up of any sorts of particles that can get out of the apertures of the divided vessels, and much different from what is of natures designation in parts fitly by her Organized upon the first construction. (For I cannot conceive it otherwise elective, than as those apertures, which on the score of the Incision, or Erosion of the Vessels must be large, can only discharge some such, sufficiently for the most part complex,

plex, substances from the bloud as are of a bulk and figure commensurate to them or less, without any relation to them as disagreeable to the rest of the masse; and so from that largeness of the apertures there must be transmitted a much greater number of useful, than truly excrementitious, substances.) To say nothing of the disturbance which the pain must occasion in a Body otherwise sound. Whereas most of the useful evacuating administrations (except Phlebotomy, which produces its effect mainly by the quantity 'tis used in) make, or presuppose, a laxity, and separation of parts, in the substances from whence the evacuation is to be had, as well as effect it at emissaries fitly framed and disposed to let go such or such determinate humours.

Secondly; As to the corroborating

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ting the Crasis of the blood: Though those who are in perfect health need it not, and medecines of that tendency may perhaps make it ferment too highly, and so perhaps occasionally introduce the distemper which the pretext of giving them is to prevent; yet to valetudinary persons, or those whose blood, upon emission, appears viscus, or is otherwise depraved, I suppose such administrations are very necessary. And to such I would (universals premised) propose a course of bitter medcines, both at Spring and Fall, if they are of cold and Phlegmatick constitutions; as I would advise others, whose blood is too apt on light occasions to be exagitated, the familiar use of appropriate calming medcines. But to all, Chalybeates (to be diversified, and given with different vehicles, according  
to

to the several constitutions of persons) may be of most extensive use; and have this to recommend them, that they need no strict regulation, nay their effect is depressed by confinement; stirring and changing the Air both actuating them, and exciting and fermenting the blood, as also strengthening the tone of the parts. Of these, the Chalybeat waters, as those of *Tunbridge*, *Astrap*, and (which, I believe, is second to none) *Ilmington* in your neighbourhood, and the like, drank in Summer (and perhaps at other seasons, but that custom has not authorized it here; though *Henricus ab Heers*, as great a judge of that as any man, in his *Spadacrene*, Prescribed them with as good success in the midst of Winter as at any time besides) for a month or longer, are, as the most familiar, and confirmed by the pra-

Use of the greatest Physicians of many ages, so perhaps the most efficacious of any preparation of Steel, as being taken up by the water running through the Minera whilst the mettall is yet in *solutis principiis*, as the Chymists speak, and so most subtil and active; if so be the *Brain* happen not before to have been too much intenerated: in which case perhaps the water it self, Symbolizing with the indisposition (especially the quantity considered) may predominate over the power of the Vitriol, dissolved in it, to constringe the before weakned part. And the diversion to be used at the Wells may not a little conduce to the effect of rectifying the bloud, by exciting the Spirits.

But as to the several Chalybeate preparations, give me leave so much to digress (if you will call it a digression)

gression) as to say, that I think, if the parts of our body and crasis of the blood are only to be strengthened, and no store of *Acids* abound ; those of them that have been opened by *Acids*, and so reduced to a Vitriol, are most useful ; since they may easily and immediately be distributed, without the trouble given to Nature (which is not always able to actuate a stubborn medicine that needs a strong key to unlock it) farther to prepare them to be fit to enter into the recesses of the body. But if *Acids* abound in us, the judicious D. *Sydenhams* \* method of giving the brae limature, unaltered (for I believe his Extractum *Absynthii* can have little of the effect of an *Acid* upon it) must be the most prevalent of all ; since both the intentions, viz. of absorbing *Acids*, and then strengthening the crasis of

the blood, and the tone of the parts, are by it answered; the *Acids* in the Stomack proving perhaps as fit a menstruum for making a Vitriol, for those uses, as those in the *Chymists* hands; whereas the intention of absorbing, if it have place, can hardly be satisfied, if the medecine have been before fatiated. And indeed *Acids* being apt to be so predominant in us, especially in *Hypochondriacal* distempers, which are so very frequent (as not only very common eructations and vomitings of that kind, but the effect of Urinous Salts, testaceous medecines, the usual antiscorbuticks which are generally found to abound with volatil Salts, and other obsoberbers of *Acids*, evince; besides the rationale of such distempers which is speciously deducible from the predominancy of *Acids*) that great persons proposal of  
it



it in that, though gross, yet frequently very effectual, preparation seems to be the most universally solid: though, as I said, if *Acids* abound not, the others, I should think, would be the most effectual.

The second general Indication, The *Coroborating* the *Brain*, may be answered in a great measure by the last mentioned administrations, *viz.* the use of *Chalybeates*; whose effect is generally owned to extend it self to all the consistent parts in the Body, as well as the blood; nay must more to those, than this: since their action upon this is but transient; but those may be presumed to arrest and detain them, though not all, yet as many as their Pores can conveniently receive. For not only their Vitriolate particles, but also the grosser ones, which remain after the abruption of those (as in  
*Crocus*

*Crocus Martis Astringens*, which is made by the avolation of the Vitriol, upon a long and intense calcination) are confessedly styptical; and therefore being carried in circulation (as well as acting on the Nerves in the Stomack) to the remotest recesses in the Body and amongst them those in the *Brain*, may be presumed by their lancinations, as forcing them thereby to gentle contractions, to rectify their tone, when too *lax*, which I have supposed before to be a main condition toward producing the distemper under consideration: And this faculty they must most exert upon those parts whose indigencies are greatest; those whose tone is firm not being fitted to receive, or at least be affected by, them. So that when the *Brain* has been debilitated, they must exert that action principally there.

But

But beside these, a frequent use of the generally owned *Cephalicks*, as *Rosemary*, *Sage*, *Betony*, *Lilly of the Valley*, &c. may possibly much conduce to corroborate the *Brain*; and may, without trouble or offence, be used in the Form that *Tea* is; the general custome having denizon'd such a use of drinks: and those whose apprehensions are greater, might besides have those Ingredients fermented with their usual drinks.

But amongst all the drinks in common use ( if you will not suspect the Character given by one, who loves it so well, as you know I doe; but who withal have dranke it near thirty years, not only innoxiously, but, I seriously affirme, many times to my great advantage, especially when indisposed either at my stomach or head ) that of Coffee may perhaps contribute as much to a  
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prevention of the distemper as any ;  
 and that on a double account. *First*  
 by helping the stomach to digest,  
 which it may effect, partly by rea-  
 son of a gentle *Stypticity* the parti-  
 cles which make the *Tincture* have,  
 from the torrefaction of the berries ;  
 partly from the actual heat 'tis usu-  
 ally drank with ; both which ( but  
 more effectually when conjoyned )  
 conduce much to corroborate the  
 tone of it ; so that digestion being  
 well performed here, and good Blood  
 thence produced, much of the an-  
 tecedent cause both of *Apoplexies*  
 and other distempers must be by  
 such administrations prevented : *Se-*  
*condly*, by the action it performs,  
 I conceive , on the *Brain* it self :  
 for, by means of the moderate tor-  
 refaction, the *aqueous* parts of the  
 berry are carried away, and the vis-  
 cous are altered in their texture ;  
 whereby

whereby the fulplureous and saline  
 ( I dispute not whether preexistent,  
 or made by the preparation, upon  
 the alteration of texture ) asso-  
 ciating with the terrence, come to  
 constitute little irregular masses,  
 which are not immediately dissolu-  
 ble ( however those particles may  
 be in a tendency to avolation too,  
 by reason of their not very strict  
 combination ) but when diluted in  
 the water, after the known manner  
 of preparing the drinke, may be  
 presumed to be carryed through the  
 mass of Bloud in circulation to the  
*Brain*; and there, entring into the  
 pores of it, both keep them open  
 for a free passing of the spirits; and  
 withal ( especially if daily but mo-  
 derately, used ) keep up the due tone  
 of the *Brain* by the gentle vellica-  
 tion such particles may make upon  
 it; by which last means it becoms,  
 I con-

I conceive principally useful in the present instance. Therefore ( for I will not appropriate it to all ) it seems to me ( agreeably to Dr. *Willis's* notion, *Pharm. rat.* ) most proper for those who have too lax a constitution of the *Brain*, as whose intellects or memories generally are slow, and who are much given to sleeping, or to have a dull pain in their heads, especially upon free eating and drinking, or such as are apt to vertigoes from to *humid* a constitution, or to *Catarrhs*. But 'tis scarce proper ( that you may see how little partial I am ) for such as are of an overwatchful temper, of very keene apprehensions, with a thin habit of Body ( though I have known some of that habit with whom it has very well agreed: and that observation of agreeableness ought, by prudent persons, to be con-

consulted, not only in relation to this, but most other medecines and even meats, since experience shews that, from undiscoverable, or at least from our shallow insight into things undiscovered, causes, very probable administrations ought to be superseded, as well as the contrary used) and withal for those that are apt to convulsive symptoms upon light occasions (though, I conceive, where, besides the irritative matter that makes convulsions, there happens too great a laxity of the *Brain*, Coffee, by fortifying the one, may in great measure prevent the admission of the other.) All which to me shew the *nervosum genus* to be of a texture, in such persons, considerably compact, and comparatively dry, with which these particles may too much correspond: and it may be observed that such persons  
many

many times contract an unsteadiness or numness of their hands and other parts, as well as a general indisposedness, and uneasiness by its (even, as to others, moderate) use. And from these effects upon the inconsiderate use of it (as 'tis common to have any, though the best, remedies abused when grown popular) it has amongst many got the imputation of being a *Paralytick* drink, and disposing to *Apoplexies*; such never reflecting what multitudes of others, comparatively to the few it injures, receive advantage by it.

Perhaps too you will expect my opinion concerning my other favourite, *Tobacco*. Concerning which I must say that though I know many have an opinion of its being *Narcotick*, or otherwise injurious to the *Brain*, and consequently disposing to *Apoplexies*: yet (to say nothing



nothing of my having used it, and not sparingly, for many years, without finding any such effect of it ) the very common custome of taking it for so many scores of years since it began to be in *vogue*, must have made such a quality, if it had it, evidently taken notice of; and consequently common prudence would have obliged people to have left it off long agoe, as deleterious, if experience did not evidence the contrary: for there is no man but, if, laying aside prejudices, he will give himself the trouble to observe, may easily find, that very many live to great years, & in as great a state of health as those who take it not, that have long used it, even immoderately. It must indeed be owned that it is not agreeable to all constitutions: but the same may be said of almost any thing else, whether food or *Physick*. And I  
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presume no wise man will conclude from a few instances of the disagreeableness of any thing to some men, when vast numbers of them on the contrary side may be brought to warrant its use, that it ought universally to be avoided, or branded with a note of infamy. My sense of it is, that in those persons with whom 'tis found to agree, 'tis a very good drainer of humors, and so may supply the place of *Fontanels*, or at least that fewer of these may be necessary to those who abound with moisture. For, by its irritating and occasionally ( from the great *afflux* of the *Saliva* ) enlarging the secretory ducts in the *glandules* about the Mouth, as 'tis evident there must be a great discharge, so a great diversion from the *Brain* ( tho' I own the greatest part of the matter comes not immediately from  
 thence

thence but out of the Bloud ) in which case 'tis advisable that the persons that take it should drink but moderately ; least otherwise they do themselves more hurt by the supply than they can receive benefit by the discharge of moisture from this or any other evacuations. But there seems another reason why *Tobacco* may be useful to those who are disposed to *Apo-plexies* ( under the supposition of its agreeableness ) viz. that by reason of the vellication the smoke of it impresses on the nerves in the Mouth , it makes them contract themselves, and so by consecution the whole *Brain* comes to be analogously affected. So that if the *Brain* happen to be more *lax* than ordinary , and thereby disposed to receive an *afflux* of Bloud or *Serum*, as I take it to be especially after a

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person has had and escaped one Fit, as well indeed as in many other cases of preceding nerval indispositions, I see nothing but it may prove a very useful administration, toward restoring the tone of it: and 'tis known to be very advantageous to many *Hysterical* persons; of which though perhaps other reasons may be assigned, as the *altering the texture* of the Fermentative particles, by the association of those of the smoke to them as they chance to be admitted, and so those of other figures and bulks may hence emerge; or else the *determination of the nerves* to other motions. by the action of this smoke impressed on the *mammillary* processes, or other nerves about the Mouth or parts adjacent; yet this seems to me none of the least probable, that by *corroborating the tone* of  
of

of the *Brain* it prevents the admission of those too *elastical* or otherwise *heterogeneous* particles into the tubes of the nerves, which are the cause of the symptoms.

Also the frequent use of Volatile Salts may conduce much to a prevention, under the limitations alledged for the use of *Coffee*; such as are spirits of *Sal Armoniac*, *Hartshorne*, *Soot*, &c. (which are but such Salts diluted) as being, I conceive so congenerous to those called Animal Spirits, that they must needs excite them in us when too torpid, or supply them when wanting; unless the constitution of the Nerves be too dry or apt to be irritated by them. And their effects have, in many instances of nerval distempers, found been so remarkable, that they are now adays become

of very familiar use, though sometimes likewise abused.

But there are two specious administrations, much cryed up, and used by many, which deserve to be taken notice of, *viz. Apoplectic Balsams* (whose principal use is to be smelt to) composed of perfumes Aromaticks, and other ingredients, reputed Cephalicks, and Snuff. Concerning the former of which, give me leave to say, I think them so farr from being useful for prevention, that they most ordinarily prove very prejudicial. For by reason of their grateful smell and the great activity of their odorous particles (but without any troublesome irritation) some of them may easily enough be presumed to be admitted into the *Brain* at the extremities of the olfactory nerves with the Air in inspiration; and being once so,  
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are so farr from affifting it to contract it self, that, they much *relax* and *expand* it, and consequently dispose it to admit an *afflux* of bloud, especially when before fitted ( as I have said ) to be congested in, or make its way forth of, its vessels in the *Brain*. And their influence seems to me to be very great likewise upon the fluid substances in the *Brain*, which have all some lentor; and therefore these admitted substances, by reason of their activity, may easily exagitate them; whereby the passages must come to be enlarged, and so become capable of an *afflux* or congestion. I own indeed that, in some cases of *Headache*, they may be, and have proved a very effectual remedy; as perhaps when the matter that causes it may be acrimonious; but not in the degree or kind to produce con-

vulfive symptoms ( all sorts of aculeated particles being not fit to produce one effect : ) which the soft particles of these may, by their adhesion, so blunt or sheathe, that their lancination must therefore immediately be taken off. But as these cases are but rare; so also there ought to be a distinction made between the administration of medicines upon an emergency, and their common use when no cause requires it; which last the present caution refers too: for then there is reason to suspect they meeting with no hostile particles, may too much relax and open the pores of the *Brain*, and so give occasion to the suggested inconveniences.

If the experiment of convulsive symptoms ( which imply contractions ) ordinarily excited by these medicines in those who are disposed



sed to *Hysterick* fitts, be urged against this notion, which supposes the distemper under consideration to proceed from a *laxity*; I answer, first, that it seems probable that these convulsive symptoms proceed from a kind of *Explosion*, according to the sense of Dr. *Willis*, which must first inferr an *Expansion* of them, and then a contraction when the due requisites to it concurr: for *Secondly*, the *Aromatick* particles, though of themselves very soft, and agreeably entring at the pores of the nerves, yet finding, after their admission, *heterogeneous* and fermentative substances in the *Braines* of some persons, may be very much inclined from their congress first to agitate, and then in return be agitated by them; from whence the *Brain*, being *vellicated*, is forced into contractions to expel them:

them : upon which *lucta*, too, such *corpuscles* must, in probability be formed, as may prove very vellicating on a second score, and so continue these fitts, as being incapable to be sodainly expelled. Whereas when they happen to be applyed to persons not abounding with such fermentative particles, they may only *relax* the tone of the *Brain*, and so dispose to *Apoplexies* on the forementioned account.

On the same score, I conceive *Snus*, especially made as 'tis usually, with *Aromaticks* and *Perfumes*, and so mild (either on the account of its ingredients, or from frequent use) as not to cause *Sternutation*, to be prejudicial, instead of being advantageous, to the health of those that immoderately use it, and more perhaps then the *Apolectic Balsoms*: because both the  
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matter of it is more gross, and thence apt to lye longer about the extremity of the *Olfactory nerves*, and so continually to affect them; and also the custome of many is, as I have often observed, ever and anon to be supplying more, whereby the pores of those nerves are kept continually open. And I must suspect, that should any *Pestilential Season* invade (which *God* avert) such persons, as much accustom themselves to these powders, would, *cæteris paribus*, be in more danger of receiving infection than others: since from the symptoms delivered by Authors, the pestilence appears to seize the *Brain* particularly; and the sad fate recorded of those that, without any preceding indisposition, have, whilst that raged, fallen down dead in the streets, seems not so easily accountable

table for any other occasion, than that the pestilential *Miasmes* are admitted at those nerves, since all other ways to the *Brain*, the source of sense and motion, and indeed of all the actions of life, is the most likely seate of this sodain prostration. 'Tis true, it may be urged, that many which use it receive no apparent injury: and indeed some are of so firm a constitution of the *Brain*, as well as of the whole Body that comparatively great occasions of sickness will have little or no influence on them, whereas others are affected by very small ones. But I think the objection may as well be urged (as on another score I a little before intimated) by those, who having long indulged themselves in immoderate drinking have yet lived to a great age, when 'tis obvious that many more much shorten

ten their Lives by it. But though not *Apoplexies*, yet *Vertigoes*, and other distempers which shew the *Brain* debilitated, may hence perhaps arise.

Secondly, as to the *Cure* of an *Apoplexy*; It consists (according to my notion before alledged of the Cause) chiefly in copious *Pblebotomy*, since nothing else seems capable of dislodging (at least *sodainly*: and this distemper of all others requires a *Sodain* remedy) the morbifick matter, For the distention, both of the Sanguiferous vessels, and habit of the parts, being by a good depletion taken off *sodainly*, the *Fibres* which constitute both must be presumed to contract themselves by their Tonic motion, but especially those in the habit; the Elastical pressure of the Ambient, as concurring ordinarily. So in this case especially when  
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the resistance within is abated. So that when what is nearest the Heart runs into it with some impetuosity, the rest, both finding room enough in the Veines, and being urged on, not only by the arterial blood behind, rushing into the veins the faster when it has more room, but also by the Systaltick motion now the distention is taken off, must leave its former recesses, and be restored to circulation. Which action is quickly propagated to the *Brain*, and that put into Analogous contractions. But this may be presumed most effectually to happen whilst the Vessels are only distended before the blood hath made its way forth into the habit of the *Brain*; which if it once hath, at least in any considerable quantity, the distemper seems scarce at all remediable, either by this or any other administrations;

tions; both on the account of the forementioned difficulty, if not impossibility, of its getting out of those recesses into the veines again, and also the yeildingness of the *Brain* to the Pulsifick protrusion of the blood behind.

This Phlebotomy, I conceive, ought to be administred to Thirty, Fourty, Fifty, or Sixty, or perhaps more, ounces at a time (some persons requiring more to be taken away, some less, according as the congestion and obstruction happens to be greater or less, and the quantity of blood to abound in the Body) if the Pulse (which should be tryed during the bleeding) fail not: Otherwise, considering the great quantity we have in our Bodies, 'twill not satisfy the indication. And by such an evacuation, *viz.* to at least *Sixty* ounces at once, D. *Gibbons* of *Oxon*,

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(a person whom you, as well as I, know to be, besides his great parts, and general Learning, of that sagacity, and judgment in Physick, that his example must much justify the practise) cured an *Apoplexy* there some time since, thought deplorable: as, if you question the relation from me, you may be satisfied both from himself, and his Chirurgeon, and also several others that were present. And were it proper for me I could alledge *Analogous* instances of such profuse (if you will call them so) evacuations of that kind in my own observation, attempted with great advantage to my Patients. And if the first bleeding secure not the Patient, it ought after a few hours to be repeated, and so, if need be, several times: there being much more danger from the disease, than loss of blood, which has usually been observed



observed to have been spent (as I  
 a little before noted) upon wounds,  
 or Spontaneous Hæmorrhages, in  
 much greater quantity without loss  
 of Life; and the consequent weak-  
 ness has soon been corrected by a  
 due regimen of diet, or perhaps some  
 other assistances. Nay even *Old Age*  
 ought not to supersede this reme-  
 dy, however the assertion be like to  
 be censured for very bold by many,  
 who more consult their own fears,  
 than the reason of the thing. For  
 besides that such antient persons,  
 who are inclined to *Apoplexies*, ge-  
 nerally abound enough with blood,  
 theirs is more apt to grow viscous  
 from their decay, in some degree,  
 of spirits, and their inability to a  
 sufficiently brisk action, requisite  
 to spiritualize, and keep it in a due  
 crasis: so that when apt to distend,  
 or get out of its vessels, it ought to  
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be taken away in good quantities, both in regard the decayed strength of the part affected is not, proportionally to what it formerly was, sufficient to manage it, and return it into its proper vessels, or its usual circulation in them; and also because, if it be in them once grown viscous, 'tis scarce possible it can be corrected for the forementioned reasons; and therefore (according to the sense of the deservedly famous *Botallus*) ought to be taken away that better, from the supervening nourishment, may be substituted in the roome of it: the sanguifying power, though upon a considerable abatement of the quantity, being in the rest sufficient, even in the eldest persons, to transmute the appelling *Chyle*, which from its previous preparations (we feeding on nothing but vegetable, or animal, substances,

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ces, which must be highly digested and exalted to be brought to either of those estates; and those farther exalted generally, either by Elixation, affation, or fermentation) wants little of the perfection of Bloud, even before its admission into the mass of it; as, if prejudices were laid aside, might be collected from instances, which now and then occur, of old people, who by wounds or *hæmorrhages* loose great quantities of it, and yet recover, nay many times increase, the vigor they had before these accidents: and I see no reason why, what nature or chance authorize to be innoxious, may not be attempted by art, when great indications occur, which intimate how unsafe 'tis to permit them to goe unsatisfyed. And to countenance this opinion, give me leave to subjoyne (though 'twere

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not hard for me to bring many more instances of this kind ) that 'tis near two years since a very worthy Lady, the *Lady Tate of Harvington in Worcester-Shire*, of the age then of 77 years, was taken *Apoplectical*, and though the imminent danger of it were taken off before *Phlebotomy* was administred; yet it left so great a *vertigo*, and so general a weaknels on the *Brain*, and all the Body (her *Ladyship*, though before very vigorous, considering her age, and endued with a very great understanding and memory, as all that have the honour to converse with her must testify, being reduced to the condition not to turn her self in her bed, besides a great decay of the intellectual faculties) that to comply with my judgment, and the duty thence resulting to my patients who put their lives under my conduct,

duct, I caused (as soon as leave could be obtained) between twenty and thirty ounces of Blood to be taken away, with great, and immediate, success: and the like was done again, in the same quantity, within a week after, upon a fresh increase of the symptoms, without any debilitation from it; but on the contrary with remarkable advantage, both in relation to her recovery of memory and understanding, and also strength of Body. Since which time her *Ladyship*, using due medicines and regulation, has farther attained so great a degree of these powers, as at these years is much above the expectation of any that were witnesses of her indisposition.

I conceive indeed (to endeavour to evince a little the utility of *Phlebotomy* in ancient people; if you will not call it an excursion) *Old*

*Age* to consist more in the Induration of the *Solid parts*, than in the absumption, vappidness, depauperation, or any other depression of the spirits in the *Fluids*; or what we call the *Humidum radicale*: for these fluids are daily repaired, and would be in as high a degree spirituous as ever (considering the previous exaltations just now mentioned) were the solid parts equally disposed to impress due motions on them, and the Strainers, and other passages, fitted as formerly for their transmission and *Secretions*. Whereas those once growing harder can neither undergoe their due contractive motions, as they were wont, nor thence sufficiently effect a division of the particles of these, wherein *Spiritualization* consists: only the finer and more spirituous (if agreeable) the substances are that are brought

brought to them by the Chyle, the more they must be a new intenerated, and so become more fit to perform their office toward the adapting these for the functions of life. And as to what concernes the celebrated notion of a *Humidum radicale*, which begins with our life, and continues individually the same, tho' in quantity diminished, and allayed (which diminution must on the same account, before it arrives at its utmost periods, cause *Old Age*;) I can hardly think that, Considering the comparative tenderness of our Bodies, the motions both of our Blood and other fluids within us, and of the *Atmosphere*, that (in more than one sense) *unfathomable menstruum* for the dissolution of Bodies, without us, the daily supplies of *aliments* whose particles are sufficiently on the score of their texture agitable,

and the openness of the pores every where; any particles that constituted them at first can continue for any number of years, but must be all, one after another, in no long time thrust forth as these causes come to act on them, to make way for fresh ones, that bring with them a futableness to the parts, which they, on those accounts, must have lost. For I cannot apprehend any other difference ( according to the slenderness of my capacity ) between the *Spiritus insiti, Influentes, Humidum nativum*, if these be corporeal, as I know not 'twas ever doubted, and the Rest of the grosser substance that makes up the Body, than what depends upon the Figure, Magnitude, Contexture, and Relations thence resulting: so that the more fine and subtil any of these substances are, I conceive they are so much the more easily



easily diffipable, and therefore far from being so durable as the supposition of the *Humidum radicale* requires.

When therefore on any occasion the Bloud; in those who have this induration of the parts, becomes unapt to be duly moved as 'twas wont, it seems very requisite that it should be taken away in some such quantity, as to render the motion of the rest more placid ( the distention of the vessels being thus taken off ) so to make roome for what is more fine, and apt enough to be quickly spiritualized, and to become a fitter matter for nutrition ( and, if you please, supplies of the *Humidum radicale* ) whereby also that degree of rigidness of the parts, by the appulse of this softer Bloud, may be corrected, and so, besides the satisfying many times

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a present and urgent indication, *Life* prolonged, if this administration were more frequently, but prudently, used, to a considerably longer date, than for the most part it has.

But to returne: If we make but a reflection on the quantity of blood which very able Physicians have concluded to be naturally in our Bodies, *viz.* from about 16 to 25 pounds according to the bulk and constitutions of persons; which, too, by full feeding, and want of due exercise, may possibly at some times be considerably increased; and withall how that many not only live under great fastings for many days, whether for want of appetite or constraint, which (Evacuations proceeding notwithstanding, at least that of Transpiration, which, according to the observations

tions of the accurate *Sanctorius*, is much the greatest of them all) must necessarily diminish the quantity of blood much below the proportion that any Physician by bleeding dares (though for reasons not so proper for this place, and the brevity of a letter already swelled too much, the advantages thence resulting in many cases equall not those of a free Phlebotomy) and yet afterwards recover to as good a state of health as ever they enjoyed, we ought to lay aside those panick fears of a comparatively plentiful evacuation this way; especially when the distemper seems hardly superable without it: and a little delay and oversight in this point, as well as in war, puts the matter past retrieving. I know large bleedings (nay even in *Pleurisies*, *Peripneumonias*, *Anginas*, &c.) are much dreaded by many, not only

ly of the unconfidering vulgar, but even perfons of all degrees, and education, and even by many Phyficians of great name: And 'twere eafy to cite great Authors, who have either expreffed their fears of it, or fo mince the matter, that their apprehenfions are obvious enough: and he that frequently uſes it cannot eſcape aſperſions (*expertus loquor*) be the advantage to the patient ever ſo remarkable, and muſt expect, notwithstanding that, alwayes to be dreaded for a Phyſitian; but muſt at leaſt be ſure to be greatly cenſured, if, either through the greatneſs of the diſtemper, or the (very common unmanagableneſs of the Patient, either from his own inclination, or others ſuggeſtion, ſucceſs attend it not. But certainly he muſt have a ſtrict account to give who, taking charge of Lives, will, to their loſs

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or, at least, hazard, be rather swayed by others, or his own, fear than his judgment, but a much stricter, if a prospect of Interest, by complying with peoples inclinations (which I am afraid is too common amongst pretenders to Physick) tempt him to deflect from it. And therefore he ought not be concerned at these *Bruta Fulmina*, but follow the dictates of his reason and conscience. For my own part, though I am farr from thinking Phlebotomy proper for the cure of all diseases, or even to be largely administred in most, but that a solid judgment (which I am sure the greatest number of the censurers of it have not) from substantial grounds in Physick, ought to determine when it is to be advised, and when not; yet I think it might be more frequently, and in many cases much more copiously used, than (at least in  
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the place where I live) it is or will be permitted to be: And I should be obliged to him that should convince me of my mistake in this notion (having hitherto thought I had Reason, but I am sure I have had Experience, to confirm me in a good opinion of it) particularly in relation to *Apoplexies*, as having not been so happy, in my reading, to meet with that satisfaction; Or shall propose such other certain remedies, or methods of cure, as would supersede its use in this, or other cases, that I think require it. But I must subjoyne, that I cannot but much wonder that *Barbette* a Physitian of Considerable reputation, and whose *Praxis* is in the hands of all Physitians, should have those ill notions of Phlebotomy, as to reflect upon it, as the cause of the miscarriage of the *Apo-plectical* patients, he instances in;  
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when both 'tis probable, from what he says, there was but very little blood taken away, and also 'tis easy to be collected he never durst try the remedy in its due latitude; but, in compliance to his prejudices, would rather let them dye under a (without this) unpromising method, than attempt a cure by it, against which (whatever he could) he does not urge any reason of moment.

As to the place where Phlebotomy ought to be administred: though there being a Circulation of the blood, any part of the Body, where a Veine can be readily come at, may be proper enough; since the Vessels being considerably empty'd any where, the remaining blood will, 'tis known, come from all others, especially that where 'tis too much congested, to fill them again, and so keep up the proportion every where  
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(and the forementioned *Systaltick motion* must when the *Plethora* is taken off, assist the brisker circulation through parts before distended:) Yet the *Jugular*, if it can be met with, is the most proper Veine for this discharge, since it evacuates immediately only from the head; whereas those of the Limbs, doe it but mediately, as requiring a good quantity to be taken away, before what lyes in the *Brain* can come to be extruded, according to the known laws of Circulation. And this may recommend it self the more to the timorous Assistants; since so 'tis likely the relief will be as the more speedy, so with less expence of bloud.

But besides (but especially after) Phlebotomy, I conceive other remedies ought to be, with all speed, used, as *Vesicatories*, *Cupping glasses*, *Sternutations* or other *Errhines*,  
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*Apophlegmatismes*, *acrimonious Cataplasmes* to the feet and wrists, *Volatil salts* or *Asa fætida*, or the like, in *odour*, and any other Administrations in order to excite, and make the *Brain* contract it self, to expel the morbid matter, as well as to divert the course of it: as also that inwardly be given *spirit* of *Sal-armoniack* or other *Volatil salts*, *Castor*, and other brisk Nerval remedies, which may so irritate, as to cause a corroboration of its tone; that so the effused, or congested, matter may come to be extruded, and at last resumed by the veines. To this intent likewise, *Vomitories*, and *Purgatives* ( of which, as of the rest, Authors have store, as for the due administration of them the presence and judgment of a *Physitian* is necessary) ought, as occasion is, to be brought into use. And if the distemper begin  
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once to yeild to the efficacy of these remedies ; As I before intimated, so I must again suggest, that corroborating ones should for a long time be insisted on, to restore the *Brain* and the *Nerves* to their pristine tone.

After all give me leave to subjoyne that you may collect a great *Specimen* of my deference to you from hence, that for the satisfaction (which yet I am afraid they'l think not given) of some of your Friends, as you suggest, to whom the *Latin* tongue is not so easy, I publish this (against the advice of some great ones of my own, and those great Judges) in our own Language, when most of the speculations had been (perhaps) as easily, but more fitly delivered in that ; and withall, give me leave to say, several of them so much out of the way of those, that understand only the *English* tongue, that few such  
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will, perhaps relish them. And indeed though nothing here brought, can be pretended at all instructive, either to your self, or other great Physicians of this Age (than which none ever enjoyed numbers of them of greater, if equal, abilities) but must be looked on as very *jejune*, as being drawn up by one who is so very conscious of his own inabilities, that it may be construed arrogance to appear at all thus publickly; yet since I must so far dissent from you as to believe, 'tis likely the Discourse may meet with not many Readers but those of the Faculty of Physick; who perhaps out of curiosity may give themselves that trouble; though but to censure the composer; it ought at least to have been written in the Language in which you are most accustomed to imploy your selves. But I must needs say the argument you

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urge, from the example of the very great Mr. *Boyle*, Dr. *Henshaw*, and several other great, as well Physicians, as Philosophers (not to urge that of former Ages) both of our own, and neighbouring Nations, who have thought fit to write in their own Language) particularly the very learned Dr. *Tho. Burnet*, who has been pleased to oblige his own Nation, by publishing his most curious *Theory*, and that much improved, in its own, after he had done it first in *Latin*) has enough in it to plead my excuse to those who advise the contrary.

But indeed there may be one reason of moment, I conceive, alledged, why 'tis fitting something should be written in the language of each country concerning this, more than any other. Disease; *viz.* because this, of all, requires the speediest relief: and  
*Physitians*

*Physitians* not being always at hand, Charity obliges that all should have such remedies made known to them as may put a stop to the danger, till farther help can be had. And *Pblebotomy* being that great, and almost certain, (not to say only) one, when there is any hope of recovery; as 'tis fitting the generality of people should be convinced of it, as well as their danger without it ( though indeed it may be suspected, so great are the prejudices most have, not very many will ) and therefore, if any be seized, others should have immediate recourse to it for them, without staying for a *Physitian*; so it may be some farther *Apology* for my adventuring to gratify you, since no Body else, that I know of, has in English written *ex professo* of it singly; at least with those convictions, which I have upon me, of the necessity of *this Remedy*.  
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( 196 )

However I must herein own your friendship; that since you will have me write, you would have me do it with that advantage to my reputation, not to expose my weakness, by attempting it in the Learned Language; wherein you must be conscious, from former instances, how much I am deficient. If any of my notions, here delivered, suit not with yours, I expect, in return, your sense upon them; which, If convincing to my understanding, shall be gratefully acknowledged, and subscribed to, by,

*Sir,*

*Your most Faithfull  
Friend, and Servant*

Worcester,  
Aug. 20. 1688.



*P. 43. line 17. for Excuse, read Excuse. p. 143. l. 1. r. we may. p. 139. l. 10. r. may from. p. 143. l. 1. r. Sweats. p. 151. m. r. assumption. p. 170. l. 4. after Brain, r. seems farther about; and I suppose will be allowed that the Brain.*

*F I N I S.*

